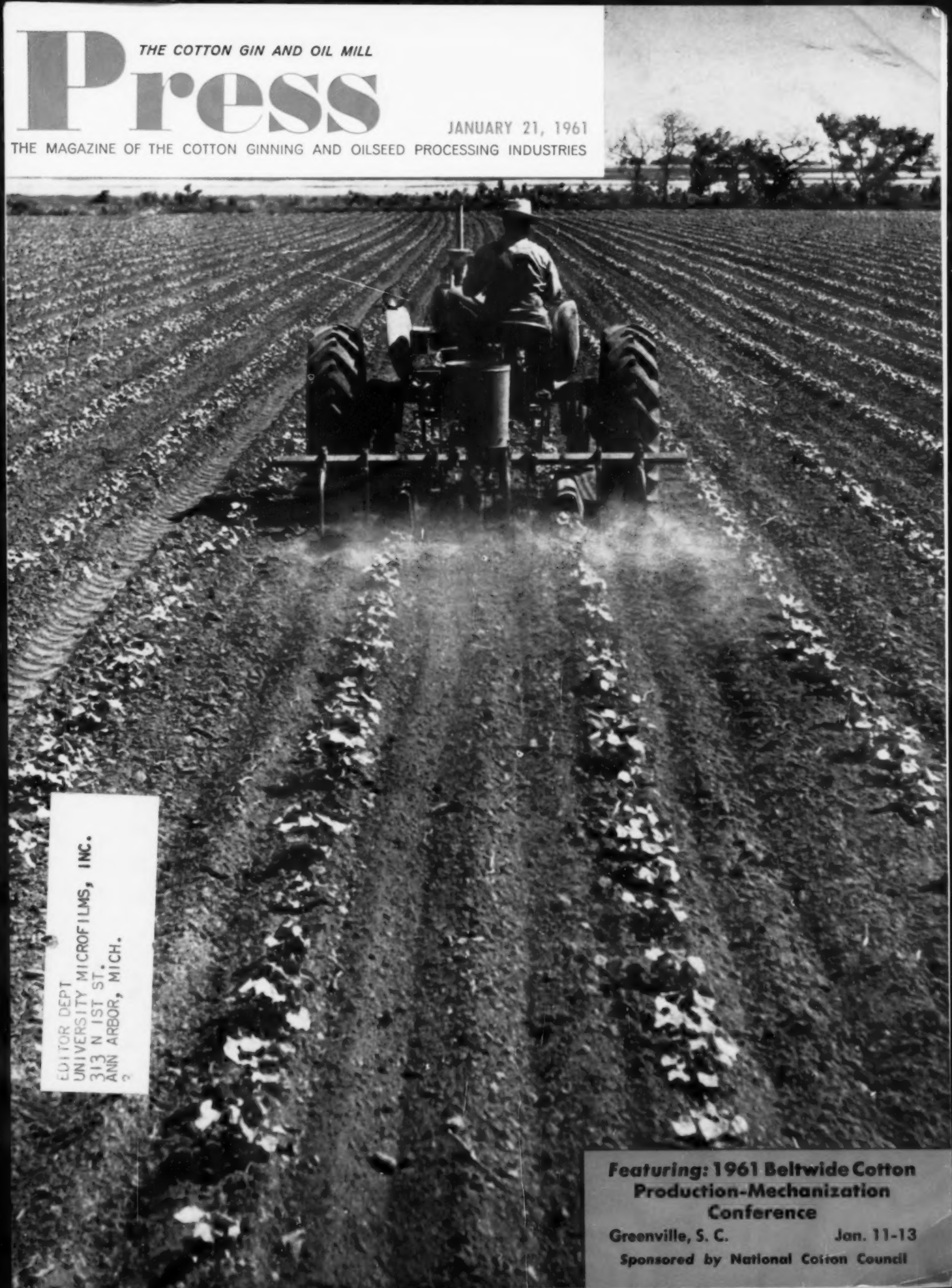
THE COTTON GIN AND OIL MILL

Press

JANUARY 21, 1961

THE MAGAZINE OF THE COTTON GINNING AND OILSEED PROCESSING INDUSTRIES



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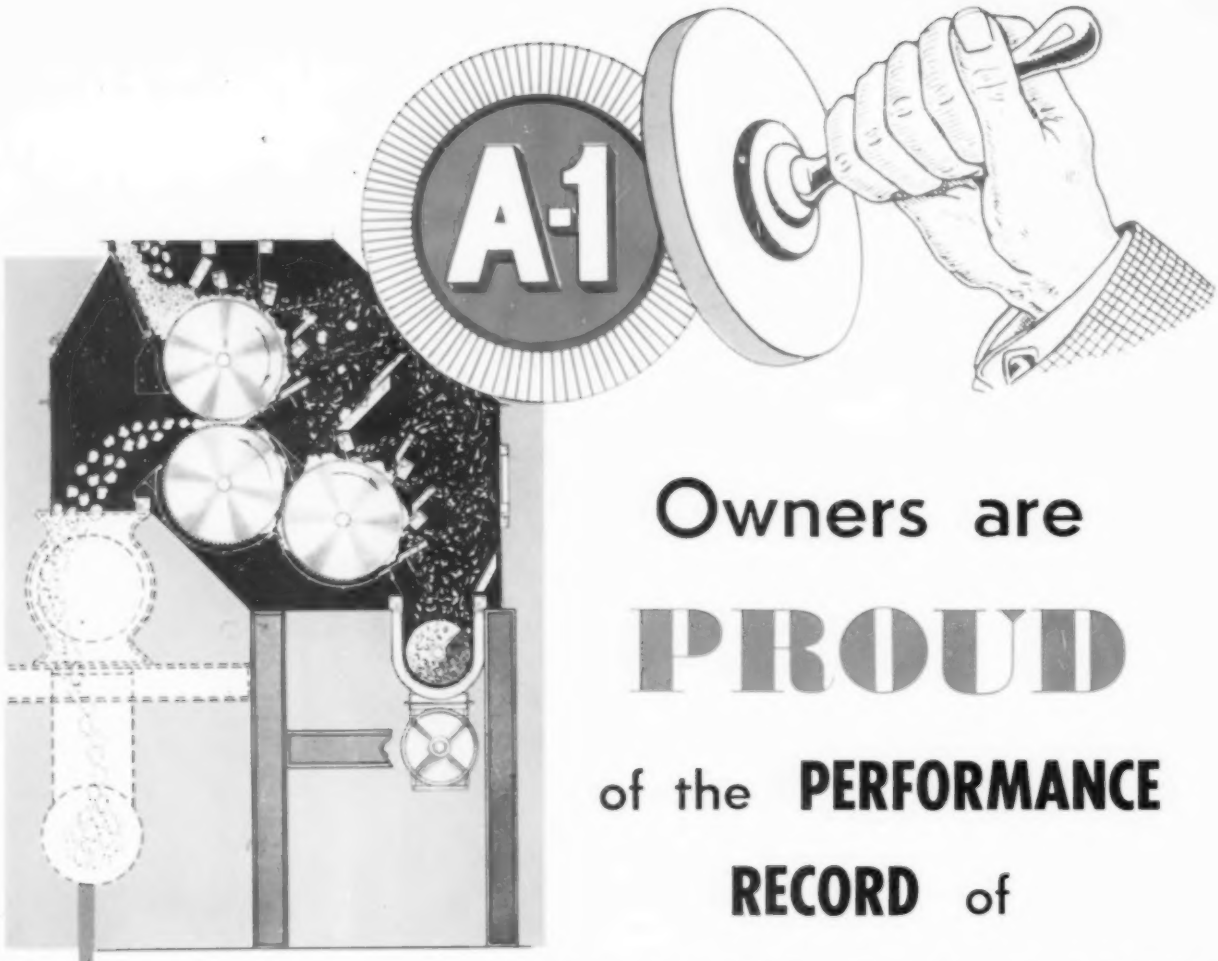
Greenville, S. C. **Jan. 11-13**

***Sponsored* by National Cotton Council**



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- Field-tested, field-proven and field accepted by scores of pleased owners, the Little Giant Stick and Green Leaf Machine removes vines, grass, bark, spindle twists and other products of mechanical harvesting. Produces higher grade lint, resulting in increased profits for you.

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In the Mitchell Super Champ, when the cotton that escapes through the grid bars is reclaimed, it is returned to the cleaning stream ahead of the grid bar extracting mechanism, thus receiving a double cleaning. This is an exclusive feature covered by U. S. patents No. 2,739,353 and No. 2,776,454.

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7 SAW

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5 SAW

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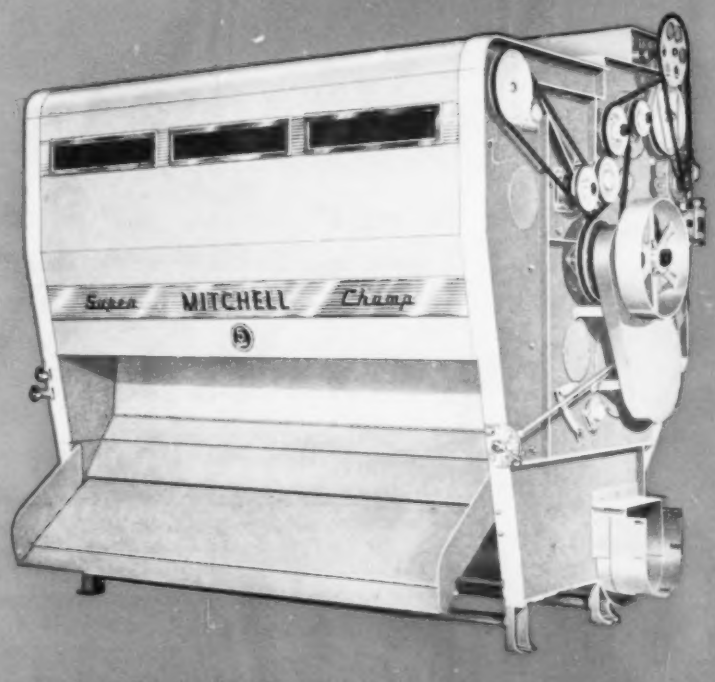

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THEY CAN'T MISS THE CENTER

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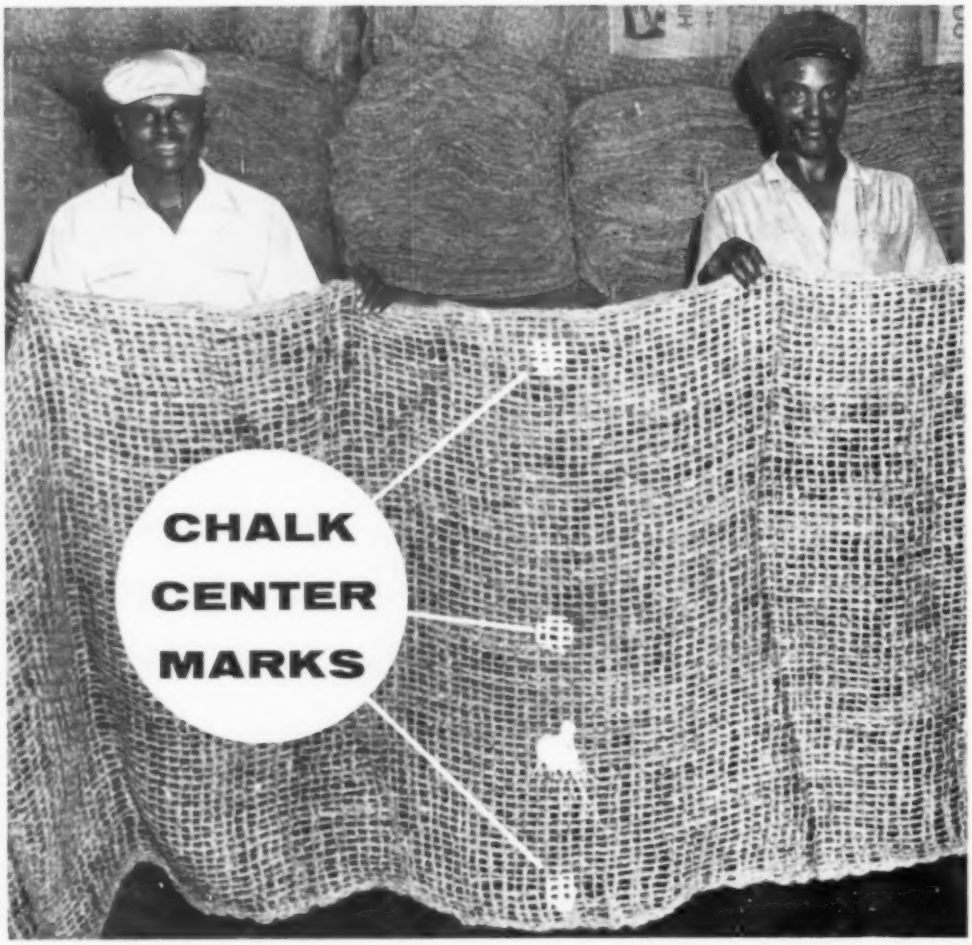

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Ludlow is the oldest, largest and only American company that makes its own bagging all the way from fibre to finished product. The result is a consistency and uniformity of quality . . . from pattern to pattern . . . from shipment to shipment — that you can count on without fail. And the convenience of the new center marks is yours at no extra cost. Write Dept. CG11.

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WITH CENTER MARKINGS

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CONTINENTAL GIN COMPANY

VOL. 62 JAN. 21, 1961 NO. 2

THE COTTON GIN AND OIL MILL PRESS

THE COTTON GIN AND OIL MILL PRESS...

READ BY COTTON GINNERS, COTTONSEED CRUSHERS AND OTHER OILSEED PROCESSORS FROM CALIFORNIA TO THE CAROLINAS

* * *

OFFICIAL MAGAZINE OF:

NATIONAL COTTONSEED PRODUCTS ASSOCIATION
NATIONAL COTTON GINNERS' ASSOCIATION
ALABAMA COTTON GINNERS' ASSOCIATION
ARIZONA GINNERS' ASSOCIATION
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THE COTTON GIN AND OIL MILL PRESS is the Official Magazine of the foregoing associations for official communications and news releases, but the associations are in no way responsible for the editorial expressions or policies contained herein.

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WASHINGTON REPRESENTATIVE (EDITORIAL ONLY)

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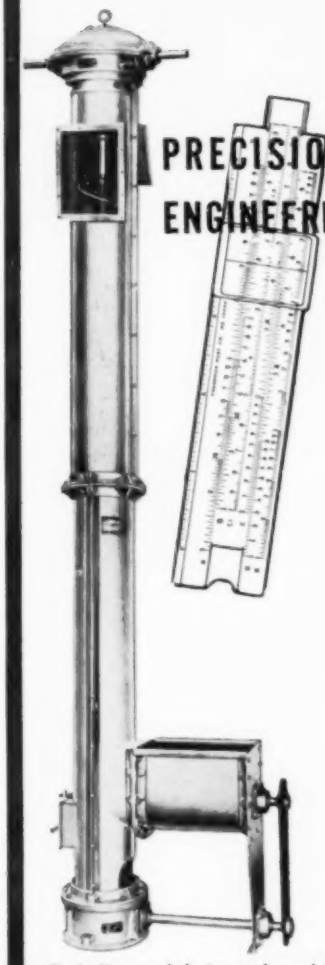
Washington 6, D. C.

OUR COVER PICTURE:

For the producer, another cotton season is starting with the planting of the 1961 crop in the Lower Rio Grande Valley of Texas—and for many cotton leaders, with the holding of the annual Beltwide Cotton Production-Mechanization Conference by the National Cotton Council and other sponsors. The cotton cover scene is for an issue which contains the Conference Summary-Proceedings, the announcement of plans for the Southeastern Gin Suppliers Exhibit, plans for the Council's annual meeting and other signs of increased activity in cotton as 1961 gets underway.

Photo by Bob Taylor

Rotor Lift



Basically sound design and precision engineering have contributed much toward the long established leadership of Rotor Lift.

There are many other factors also: Rugged construction, materials of unusual quality, unmatched performance, complete accessibility, easy maintenance.

Investigate and learn for yourself the many reasons for the marked preference for Rotor Lift shown throughout the industry, wherever free-flowing bulk materials are to be elevated, vertically or on an incline.

Write for Bulletin 60.

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* Make your own comparison. Fill in answers for any other Extraction Solvent Supplier.

When it comes to your extraction solvent supply, fast service is of utmost importance – because

(1) it avoids costly plant shutdowns, and

(2) enables you to cut costs by maintaining a minimum inventory.

Comparison of the top-quality solvent suppliers reveals that *only* AMSCO offers you this kind of service.

For *what* you want, *when* you want it, *where* you want it, call AMSCO.

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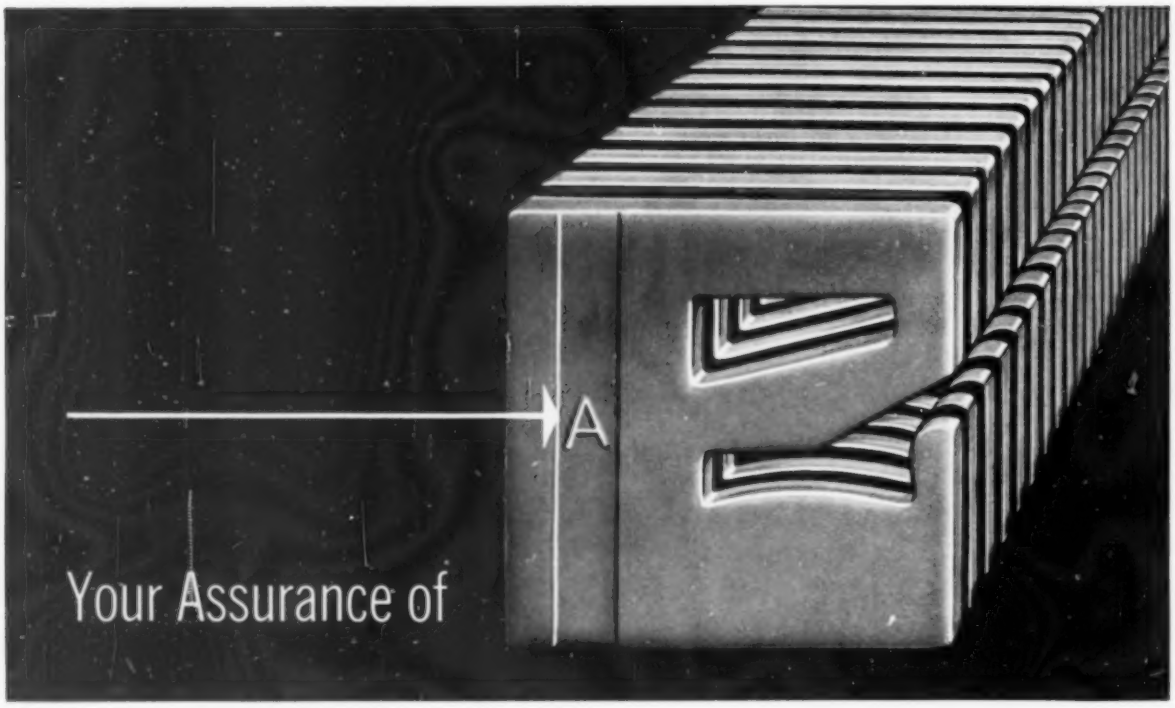
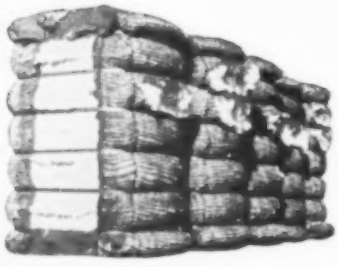


CONSISTENT QUALITY



DIXISTEEL®
COTTON TIES

Standard bundles weigh approximately 45 pounds, and contain 30 ties—each 15/16 inches by approximately 19 gauge, 11½ feet long. Sixty-pound ties are also made. Buckles available separately in any quantity.

Ginners, compressors, and shippers cannot afford to take chances on buckle or tie failures. That is why the "A" on every DIXISTEEL Buckle is so important today. It is positive assurance of top quality all of the time—not just some of the time!

DIXISTEEL Buckles consistently run 15% higher in strength than ASTM standards. They will not snap at the eye, spread, bend, or break.

DIXISTEEL Buckles are cold punched from hot-rolled special analysis new billet steel. They are tumbled to provide a smooth finish. There are no sharp edges to cut ties, gloves, or hands.

Every DIXISTEEL Buckle has these other features:

- *Guaranteed proof strength of 3,000 lbs.*
- *Breaking strength up to 6,000 lbs.*
- *Lies flat to the band; minimizes friction against other metals in boxcars, believed a cause of cotton fires.*

Be sure of quality ties and buckles. Insist on DIXISTEEL—a favorite for nearly 60 years.

DIXISTEEL TRADE MARK COTTON TIES AND BUCKLES

Made only by

Atlantic Steel Company

ATLANTA, GEORGIA

By ROY M. BRADLEY
Manager, Wasco Cooperative Gin Co., Wasco, Calif.

As Told to
ALFRED M. PENDLETON and MARVIN HOOVER*

We Like Gin Yard Basket Storage for Seed Cotton

THE HARVESTING SEASON grows ever shorter and the end is not yet in sight. Mechanical harvesting has speeded the picking season and two-row harvesters have stepped up the pace even more. Everyone concedes that this trend will continue.

In 1959 the Wasco Cooperative Gin Co. of Wasco, Calif., of which I am the manager, ginned approximately 26,000 bales of cotton on three gin plants situated on one large gin yard. We were flooded with cotton in the peak period, as are all gins faced with the problem of ever increasing numbers of mechanical harvesters. For instance, in the year 1959 almost 90 percent of the entire year's ginnings arrived on our gin yard **in a period of eight weeks.** Having prepared ahead, we were able to store 4,000 bales of this cotton safely at relatively low cost while we ginned the balance. We used a basket storage system especially built to our specifications.

This system has three components:

■ 1. The 25 by 10 by 8 foot steel, wooden-floored, wheelless trailers which we call baskets. Each will hold 10 bales of machine picked cotton, averaging 1,550 pounds per bale, without tramping or packing.

■ 2. The lifter—this is a tractor-powered eight-wheeled device (tandem) especially built to lift the basket quickly and move it rapidly to other places on the gin yard. The lifter raises the basket by means of a hydraulic system operated from the power takeoff of the tractor which pulls it.

■ 3. The unloading system—this consists of two telescopes converging into a single green-boll trap, thence to a standard gin separator, with air furnished by a 50-inch gin fan. As the cotton drops from the separator it is spread the length of the basket by a large conveyor. A part of this system also includes a device which quickly, precisely and inexpensively places a tarpaulin over the top of the basket.

So, while baskets have been used in various ways for many years on the gin yard and on the farm, we believe we have devised an improved arrangement for using the basket system on the gin yard. Our arrangement helps us meet the problems of the shorter harvesting season at a reasonable cost while still protecting cotton quality and growers' returns.

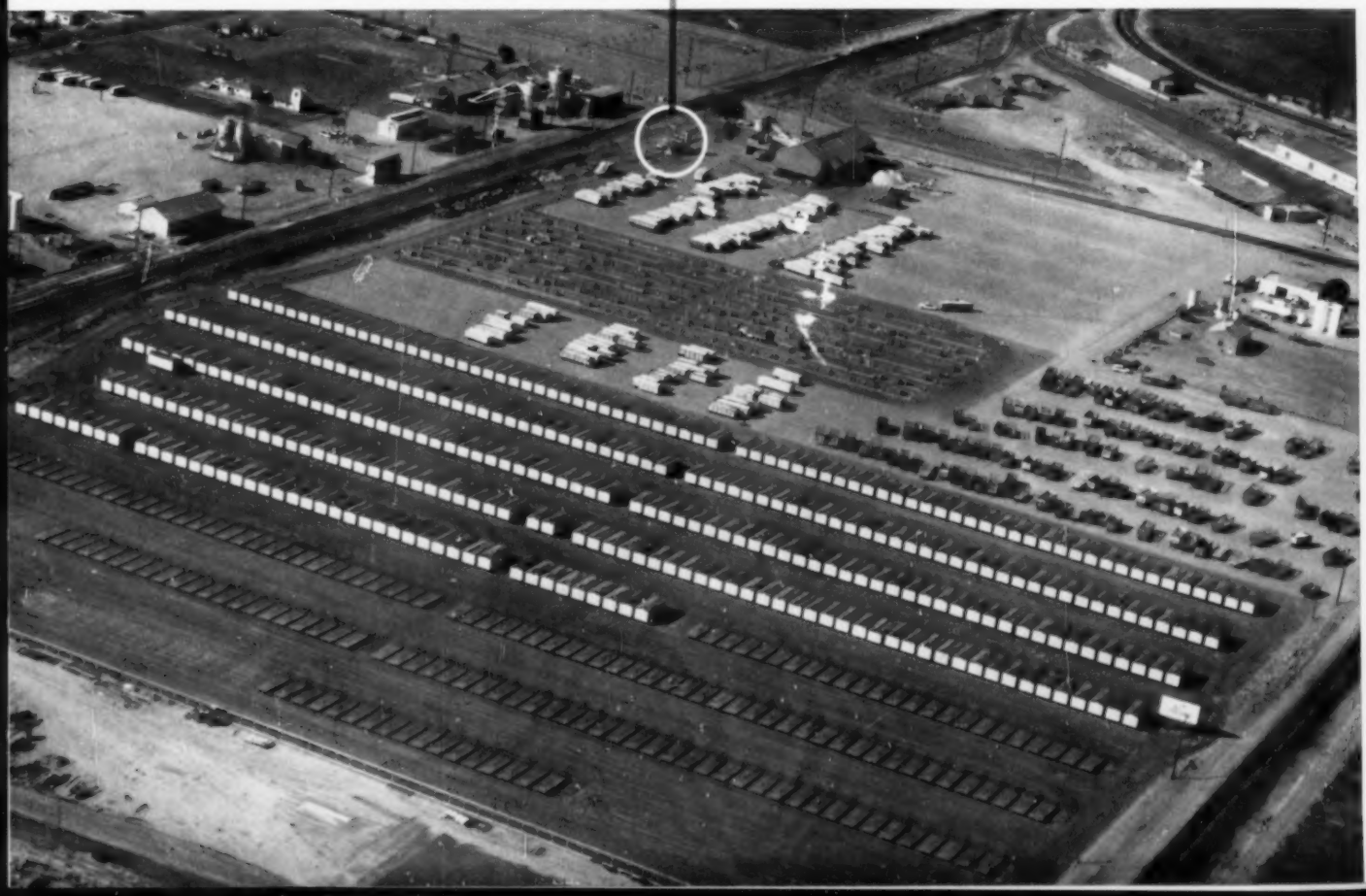
One reason we can successfully store cotton for periods of several weeks in the open is that we can now measure lint moisture in the seed cotton fairly accurately so that cotton which will contain no more than eight percent lint moisture in the basket can be selected for storage. This avoids spoilage.

Another reason this system works well for us now is that the Marvin Land Plane Co. of Woodland, Calif., built for us the two especially made basket lifters at something over $1,600 each. These enable us to move the baskets quickly and

(Continued on Page 48)

* Pendleton is agricultural engineer for the Federal Extension Service, USDA, Dallas, and Hoover is cotton specialist for the California Extension Service, University of California, Shafter.

AERIAL VIEW of the gin yard of the three gin plants of Wasco Cooperative Gin Co. with 500 baskets in use for handling seed cotton during the 1960 ginning season. The unloading center, which is explained in detail and pictured in the accompanying article, is circled in the large photograph, and shown in the smaller picture at the top of the page.



At Annual Meeting, Jan. 30-31, in Memphis

Council To Hear Outlook for Cotton

AN ANALYSIS of the outlook for cotton, reports by industry leaders who head committees, and addresses by two guest speakers will feature the 1961 annual meeting of the National Cotton Council.

With headquarters at the Peabody Hotel, delegates will begin to gather in Memphis for preliminary meetings on Thursday, through Sunday, before the general sessions are held on Monday and Tuesday, Jan. 30-31.

Senator Harry F. Bird of Virginia and Rudolph F. Bannow, Bridgeport, Conn., board chairman of the National Association of Manufacturers, will be guest speakers.

Council President J. Craig Smith, Sylacauga, Ala., textile mill executive, will discuss "The Year in Perspective" at the opening session.

Dr. M. K. Horne's report on the economic outlook will follow. Dr. Horne is the Council's chief economist.

L. T. Barringer, Memphis, will report for the finance committee at this session; and Boswell Stevens, board chairman, will make the report of a special producer committee.

Caucuses, by interests, on nominations for the Council's board of directors will be held during luncheon meetings.

"Free or Captive Enterprise" will be the subject of Bannow's address on Monday afternoon.

J. D. Hays, Huntsville, Ala., and Roy B. Davis, Lubbock, Texas, will make committee reports, with their recommendations.

The Council's 14 state units will caucus that afternoon.

Tuesday's Session

Reports on Tuesday morning will be presented by Harold F. Ohlendorf, Osceola, Ark., chairman, Foreign Trade Committee; Hugo Dixon, Memphis, chairman, and Howard Stovall, Stovall, Miss., president, Cotton Council International; D. W. Brooks, Atlanta, chairman, Educational and Publicity Committee; Washington Activities—J. Banks Young, Council Washington representative.

Senator Byrd will address the meeting on Tuesday afternoon.

Reports of the board chairman, Boswell Stevens; and treasurer, Aubrey Lockett, Vernon, Texas, will be made.

The nominating committee will report.

Directors will meet after the general session adjourns and elect officers for 1961.

J. CRAIG SMITH

BOSWELL STEVENS

TWO OF MANY industry leaders who will participate in the annual meeting of the National Cotton Council at Memphis are pictured here. J. Craig Smith, Alabama textile mill executive, is president of the Council. Boswell Stevens, Mississippi producer, is board chairman and will make a special report.

Linter Dealer
C. F. Norton Dies

C. F. Norton, Dallas, who operated one of the largest linter dealerships in the Southwest before his retirement, died Jan. 12 in a Denton hospital. He was 79.

He operated C. F. Norton Co. in Dallas and Fort Worth for many years.

Survivors are a daughter, Mrs. Raymond Willie, Sr., of Dallas; two sisters, Mrs. Annis Redden, Ennis, and Mrs. John Patton, Terrell; a grandson, Raymond Willie, Jr., Dallas; and four great-granddaughters.

Open House at Council Headquarters

OPEN HOUSE at National Cotton Council headquarters will be one of the pre-convention highlights. Scheduled from 2 to 5 p.m., on Sunday, Jan. 29, it will give cotton industry leaders across the Belt an opportunity to visit the Council Building, which was completed in 1955. The three-story Colonial-style, brick and stone structure provides offices for the executive vice-president, production and marketing division, sales promotion division and field service. Also located there are market research, information, public relations, audio visual and accounting sections.

Ginners Plan Memphis Breakfast Meeting

OFFICERS AND DIRECTORS of National Cotton Ginners Association and all ginner delegates to the National Cotton Council are invited to a complimentary breakfast on Monday, Jan. 30. The breakfast will start at 8 a.m. in Room 200 of the Peabody Hotel in Memphis.

Past presidents of National Ginners will be honored on this occasion, C. A. Harvin, Jr., Summerton, S.C., current president of the Association, announced.

Harvin commented that so many members of the National Association will be in Memphis on this date, attending the Council annual meeting, that it seemed appropriate to pay tribute to the men who have led the national organization of ginners in the past.

The annual meeting of National Cotton Ginners will be held in Mississippi, at the special invitation of ginners of that state, later in the year, Harvin said.

In Memphis, Jan. 21

Cotton Producers Meet, Plan Recommendations

American Cotton Producers Associates directors met in Memphis Jan. 21. Vernon W. Scott, president, said that discussions would center around policies which the organization should recommend at a meeting on Jan. 26 in Washington.

The meeting will be with President John F. Kennedy and Secretary of Agriculture Orville Freeman. Many farm groups have been invited to participate.

PARTNERS WITH "WHITE GOLD"

Over 1,000,000 farmers in the U. S. grow cotton. Countless other people depend on cotton for their livelihood. In its movement from field to gin, to compress and warehouse . . . in its transportation at home and abroad to mills and factories . . . in the distribution of its by-products to cotton oil and food processing industries, cotton creates prosperity.

At Republic, we have long been partners with cotton. As a leader in cotton banking, Republic's knowledge gained by experience, promptness and resources has worked to strengthen the cotton man's position in the market place. Next time you need counsel, financing, or both, call on Republic's experienced cotton men. They are specialists . . . here to serve *you*.

"My Bank" *to the Cotton Man*

REPUBLIC NATIONAL BANK
OF DALLAS

MEMBER FEDERAL
DEPOSIT INSURANCE CORPORATION

CAPITAL AND SURPLUS $105,000,000 ★ LARGEST IN THE SOUTH

Getting Cotton Acres Used

HOW NORTH CAROLINA DOES IT

NORTH CAROLINA is framing a strong campaign in 1961, aimed at getting the maximum production from the 508,810 acres allotted to cotton. The drive will be developed under provisions in Public Law 86-172 which have established helpful flexibility in utilization of cotton acreage.

At state level this campaign is already launched. There is close working relationship between the State ASC Committee and the cotton leadership in North Carolina. This relationship extends into all cotton producing counties in the state.

To initiate the 1961 campaign, an enclosure was placed in envelopes going from county ASC offices to each of the 80,000 North Carolina cotton allotment holders. It carried this message:

PROTECT YOUR COTTON ALLOTMENT

Do you want to keep your cotton allotment? Your allotment will be reduced if you fail to plant as much as 75 percent of it. You can prevent this loss of allotment by releasing the acreage to the ASC office.

If you plant your full allotment, no action is needed. If you do not plan to plant your allotment, release it to the ASC County Office. The releasing will help you and the county retain its cotton allotment. The week of Feb. 20 through 24, 1961, has been set aside as the week for farmers to release their cotton allotment at the ASC County Office.

Release of cotton allotment will be accepted now. If you desire additional acreage make your request at the ASC office.

PROTECT YOUR COTTON ALLOTMENT . . . PLANT IT OR RELEASE IT!

Immediately following this, the office of the North Carolina Cotton Promotion Associatoin released its final 1960 bulletin to cotton farm leaders, warehousemen, ginners, crushers, bankers, farm equipment firms, fertilizer dealers, county agents, and its Cotton Promotion Associates in every cotton county.

Special Week Planned

This bulletin announced that Feb. 20-24, 1961, will be Hi-Light Week for Release of Cotton Allotments in North Carolina. It also gave accented information as to the way PL 86-172 operates in relationship to individual farm allotments.

Hi-Light Week has been established as early in 1961 as possible. This was done to get maximum acreage release from farms where it will not be planted in time to reallocate it to other farms in each county, and shifted to other counties, in event more is released in a given county than will be put in use by farmers there.

Actually, cotton acreage can be released in North Carolina as soon as the notice of the 1961 allotment is received by farmers. It can be released after Feb. 24, up to the final date established by each county committee. The Hi-Light Week is emphasized to get full-scale, state-wide concentration on the program in the daily and non-daily Tarheel press, radio, TV, and agricultural press by the Public Relations Committee of our Association.

How Counties Are Working

At this local county level, the release and reapportionment campaigns will vary in pattern according to county discretion.

In Anson County, for example, a county level meeting will be held early in 1961. It will include basic cotton and business leaders, and community leaders. Lists of cotton allotment farms will be analyzed as to probability of cotton actually being planted on them. This list will be divided according to committees and direct contact assignments made within the committee. The county press, and radio will be fully utilized.

The County Agricultural Agent and County ASC office manager will work closely to get maximum action, both in release and reapportionment of acreage, by this means.

In Cleveland County, as another example, an alert county cotton promotion committee of industry leaders is gathering a small fund as they did in 1960. This will be used to employ temporarily, a local woman who formerly worked in the county ASC office. To her will be given a screened list of cotton farmers who are not expected to plant their allotments. She will operate by telephone, informing these farmers of the importance of releasing their cotton allotment if it will not be planted. She will tell them how the new procedures in PL 86-172 work; also, when, where, and how to file their release agreements.

These phone contacts will be followed up closely. The local committee will receive reports from her every day. Direct contact will be made where necessary.

By this method, Cleveland County obtained release of 3,000 acres of cotton for re-apportionment in 1960. This would not have been released otherwise in the opinion of county leaders.

Modifications of these methods will be used in other cotton counties in North Carolina. In addition, local cotton ginning firms and allied industries will sponsor striking newspaper ads adopted from posters which will be broadcast by our association carrying the above "Protect Your Allotment" message. Radio spot announcements will be on air constantly. TV will be used to the fullest extent possible.

Ahead of all this, our State ASC Committee has, for 1961, worked out a method of observing trends of cotton acreage between counties based on history of planting. This is done under the authority of certain provisions of Section 344 of the 1938 Act.

By this action approximately 35,000 acres of cotton will shift between counties in North Carolina in 1961 ahead of the release and reapportionment program which has been described. In 1960 more than 58,600 acres were released and reapportioned in our state.

Extremely bad weather, commencing with the coldest May on record in our state, forced abandonment of many planted acres in 1960.

In 1961 it is expected North Carolina will achieve a heavy movement of cotton acreage into the hands of farmers who will make use of it.

Getting cotton acres to farmers who will use them under efficient practices is the key to cotton production development in North Carolina. We believe we are moving rapidly toward a vital and stable production situation.

By W. S. WILLIAMS, JR.
1960 President,
N.C. Cotton Promotion Assn.

• Buhler Firms Merge, Plan Expansion

MERGER of Buhler Mill Engineering Co., Minneapolis, and Buhler Brothers, Inc., of Englewood, N.J., has been announced by C. R. Moor, executive vice-president of the Minneapolis firm.

The new company will be the Buhler Corporation, with Moor as president. The corporation will handle all products formerly sold by the two firms.

Executive offices will be at 4207 Nicollet Avenue, Minneapolis, until the firm's new building at 8925 Wayzata Blvd., Golden Valley, is completed. Meanwhile, Buhler will continue to maintain a smaller office in South Minneapolis as well as an office and parts warehouse in St. Louis Park.

Moor also reports that a new Buhler assembly plant for chain conveyors and pneumatic conveying units will open soon in St. Louis Park.

Both Buhler Mill Engineering Co. and its New Jersey affiliate are subsidiaries of Buhler Brothers, Uzwil, Switzerland.

New Bulletin

SECRETARY OF AGRICULTURE REVIEWS 1960 PROGRESS

The 1960 report of the Secretary of Agriculture now is available. The current agricultural situation is reviewed and Department work discussed. Benson's views about the future of agriculture also are presented. This report may be obtained from USDA Office of Information, Washington 25.

Seed Improvement Group Meets

MISSISSIPPI SEED IMPROVEMENT Association officers for the coming year discuss plans at the recent meeting in Greenwood. Left to right are: President E. M. Hood, Jr., Tunica; Vice-President Tom Reed, III, Belzoni; and Directors J. M. McIntyre, Greenwood, and J. E. Bobo, Gunnison. Other directors include V. A. Johnson, Indianola; J. A. Howart, Jr. Cleveland; and Donald T. Rogers, Philadelphia. John W. Oakley, State College, is executive secretary. Seed producers, dealers, agricultural workers and others attending the one-day meeting heard Dr. Charles Sayre, Jr., president and general manager, Staple Cotton Cooperative Association, urge financing of cotton research of greater scope and depth. Dr. Ben F. Hilburn, president emeritus, Mississippi State University, and chairman, Mississippi Industrial and Technological Research Commission; and Dr. Louis N. Wise, head, seed technology laboratory, Mississippi Experiment Station, State College, also spoke to the group.

Acreage Deadlines Set

Feb. 17 in the eastern part of the state, and March 1 in the western part, are deadlines for South Carolina farmers to release cotton allotments to county ASC Committees. Acreage may be reallocated to other farms up to March 17 in eastern counties, and March 31 in western South Carolina.

D&PL* COTTONS HAVE

MORE BUILT-IN BONUS

50 years in the cotton business, including 45 years of vigorous Research and Quality Control have given D&PL COTTONS the qualities that make more money for the grower and have more advantages for the ginner and spinner. You get RECORD YIELDS (over 4 bales in some areas); GREATER TURNOUT (36% to 40%); BETTER GRADE (see below); FIBER QUALITY that spinners want, with 1-1 16" to 1-3 32" staple and Micronaire suitable for a wide range of spinning purposes.

D&PL Breeder's Registered DELTAPINE SMOOTH LEAF

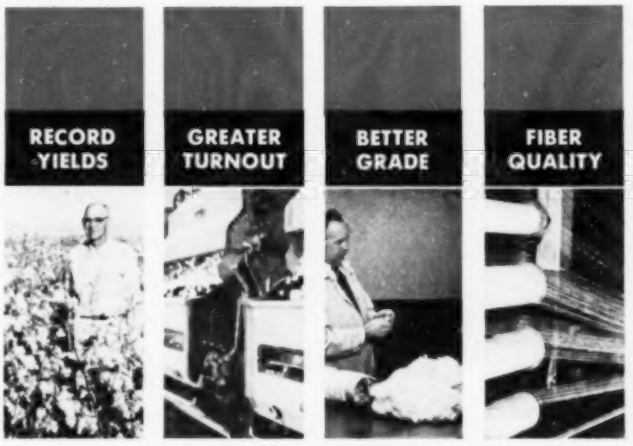
The first cotton specifically designed for mechanical harvesting. Earlier, higher yielding and with higher gin turnout than its parent, Deltapine 15. Its almost hairless leaves do not cling to lint as readily, PRODUCING THE CLEANEST COTTON EVER, up to ¼ to one full grade better than ordinary hairy varieties.

D&PL Breeder's Registered DELTAPINE 15

Standard of the cotton industry and favorite of cotton farmers everywhere because of its ability to produce under adverse conditions.

D&PL Breeder's Registered FOX 4

Early maturing and the most tolerant of all D.&P.L.Co. varieties to Fusarium and Verticillium wilt. Maintains high yield (comparable to Deltapine Smooth Leaf and other competitive varieties) in humid or arid areas.



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DELTA & PINE LAND CO., Scott, Mississippi

Celebrating Our 50th Anniversary

Reserve your D&PL Seed NOW!

*Trade-Mark of D.&P.L.Co.

In New Orleans, Feb. 20-21

Tenth Cottonseed Processing Clinic

THE TENTH ANNIVERSARY of the annual Cottonseed Processing Clinic will be observed Feb. 20-21 in New Orleans with special ceremonies. USDA, through its Southern Utilization Research and Development Division, and Mississippi Valley Oilseed Processors Association are sponsors of the yearly study and discussion of cottonseed processing.

Robert F. Patterson of Trenton, Tenn., one of the oil mill operators active in the Clinic since it began in 1950, will make an anniversary address at the opening of the 1960 event, at the USDA Laboratory.

J. H. Brawner, Southern Cotton Oil Division, Hunt Foods and Industries, and R. M. Persell, USDA, are co-chairmen of the program committee. Brawner, then with Western Cottonoil Co. at Abilene, Texas, was on the program at the initial Clinic.

As he did 10 years ago, Dr. C. H. Fisher, director of USDA's Southern Division, will welcome the cottonseed processors and others attending.

ROBERT F. PATTERSON

The program on Monday morning, Jan. 20, will center around the handling of cottonseed prior to processing.

The morning's program will close with a panel discussion moderated by A. Cecil Wamble, of the Texas Cottonseed Products Laboratory.

Cottonseed oil is the topic for the Monday afternoon session, presided over by Persell.

The first scheduled talk, "An Analysis of Future Markets for Cottonseed Oil," will be by O. C. Hester, of USDA's Agricultural Marketing Service.

W. A. Pons, Jr., of the Southern Division, will report recent findings on the improvement of color in cottonseed oil, and Brawner will report for the Committee on Hidden Oil Losses. He also will moderate the panel discussion which rounds out the afternoon program.

On Tuesday, nutritional properties of cottonseed meal is to be the general subject, with Noland F. Howard, Yazoo Valley Oil Mill, Inc., Greenwood, Miss., as chairman.

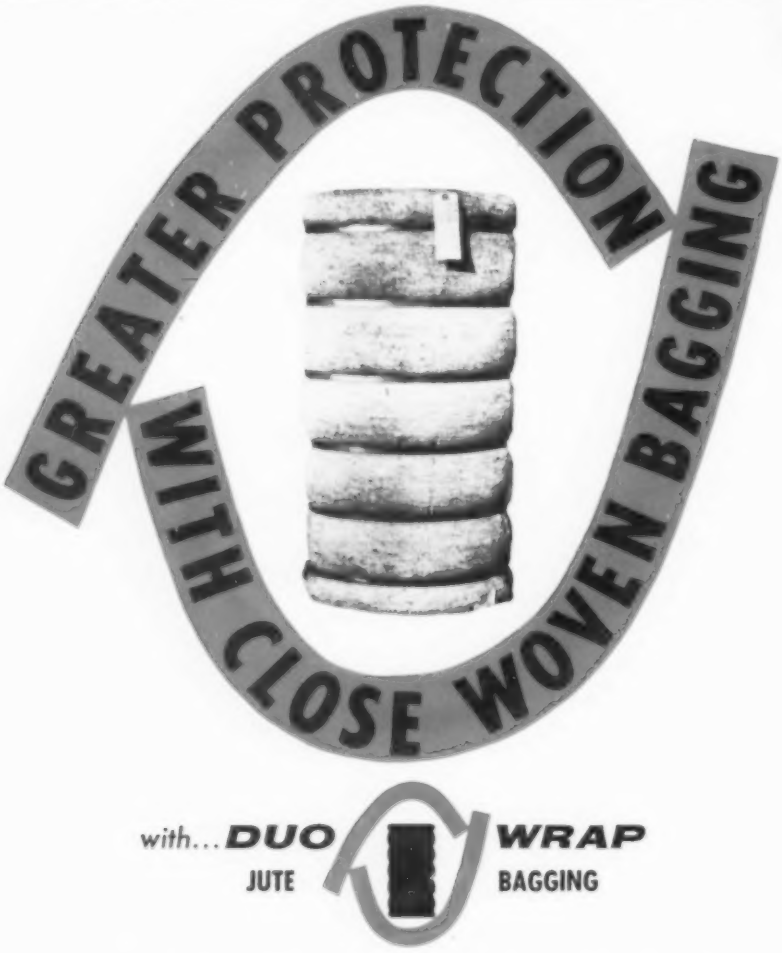
"The Nutritive Value of Cottonseed Meal" will be the topic for V. L. Frampton, of the Southern Division.

W. G. Quinn, Buckeye Cellulose Corp., Cincinnati, Ohio, will speak on "Protein Control," and Richard A. Phelps, National Cottonseed Products Association, Dallas, on the amine treatment of cottonseed meals. Dr. Phelps also will moderate the panel discussion.

The formal program will close with committee reports and other business. In the afternoon the visitors will tour the Laboratory and confer with members on the staff.

Oklahoma Co-op Ginners Schedule Meeting

Oklahoma Cooperative Ginners Association, will hold its annual meeting in Hobart, Okla., Feb. 14. The American Legion Building will be headquarters for the one-day meeting. R. S. Morgan, manager, Farmers Union Co-op Gin, Mangum, is Association secretary.



DUO-WRAP *is tough — rugged — durable.* This superior, close-woven bagging withstands hard use and rough wear . . . has extra strength for cleaner, stronger bales . . . gives maximum protection from weather. DUO-WRAP is available in five types, each having specifications of length, width and weight designed to meet individual requirements.

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STOCKS MAINTAINED IN TEXAS, NORTH AND SOUTH CAROLINA, LOUISIANA AND CALIFORNIA.
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NEW!...A SEED HOUSE YOUR OWN GIN CREW CAN ERECT...WITHOUT WELDING!

1. EASY TO ASSEMBLE
With concrete footings poured, as few as 4 men can completely erect a Wonder State Seed House in only 4 days! Wonder State Seed Houses are also easily dismantled and re-located. Easy-to-follow instructions are furnished . . . or, if you prefer, Wonder State will recommend a local authorized erector.

2. ALL-STEEL CONSTRUCTION
eliminates fire hazard; means *lower* insurance rates (compared to wood and iron-clad seed houses)! Little or no maintenance is required! No danger of cave-in from rotting timbers!

3. ACCESS DOOR AND CATWALK
for *safety* and *convenience!*

4. EXCLUSIVE RACK AND PINION ACTION HOPPER DOOR
features large (42"x 32") free-flow opening in each hopper. Makes it easier, quicker, far more efficient to load out seed.

5. IMMEDIATE DELIVERY ANYWHERE
Shipped in compact KD (knocked-down) package. Shipping weight: 20,000 pounds. (Double hopper model).

6. OPTIONAL ACCESSORIES
Wonder State Seed Houses are pre-punched for quick and easy installation of custom seed hopper, and shed for trailer storage!

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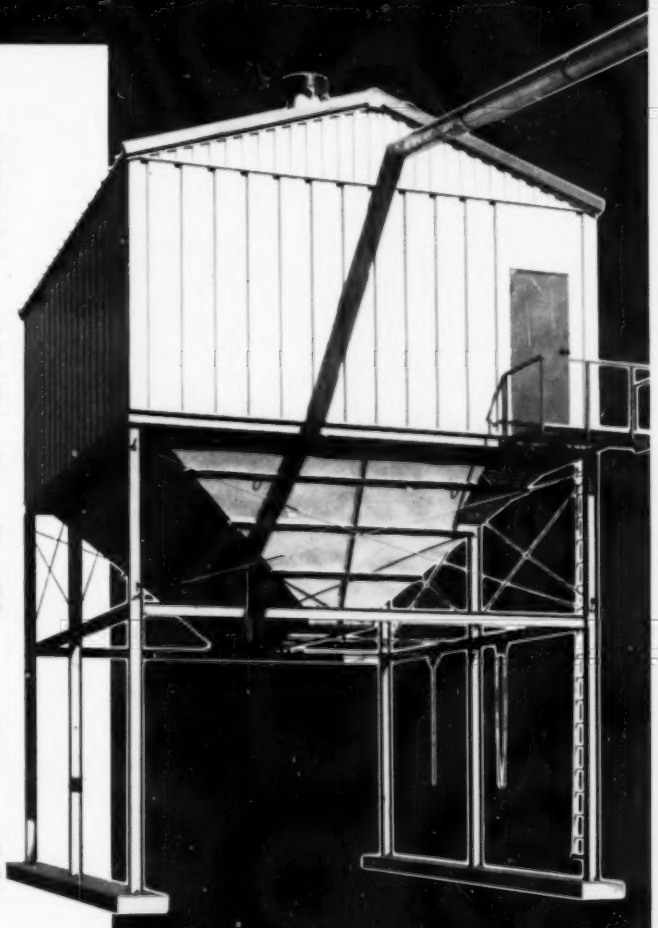
Store valuable planting seed without delinting or treating. Also ideal for grain storage. Safe from rodents.



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To Be in Memphis

Ginning Schools Set For Feb. 20-21

PLANS for schools for cotton gin operators at Memphis on Feb. 20-21 have been announced by the sponsoring organizations, following a committee meeting in Memphis on Jan. 16.

Gin machinery manufacturers, USDA and state extension services and ginning and cotton industry groups in five states (Arkansas, Mississippi, Louisiana, Missouri and Tennessee) cooperate in sponsoring the schools.

Committee members who attended the Memphis planning session included Joe Laney, Murray Co., Pat Collins, Lummus, Harold Osborne, Continental, all of Memphis. Dick Shelburne of Hardwicke-Etter and Gordon Walton, of John E. Mitchell Co., were unable to attend.

Other committee members representing sponsoring organizations included Kemper Bruton, Arkansas-Missouri Ginners Association; Waring Hazelhurst, Tennessee Ginners Association; B. F .Smith, and John H. Freeman, Jr., Delta Council of Mississippi; Harvey P. Grant, Jr., Louisiana Delta Council; David Chandler, Arkansas Extension Service; Clyde Bryson, Mississippi Extension Service; James A. Mullins, Tennessee Extension Service. A. M. Pendleton, USDA Extension Service, served the committee as coordinator; and Clyde Griffin represented the U.S. Ginning Laboratory at Stoneville, Miss.

Wayne Griggs, president, and Rita Wharton, secretary, Tennessee Agricultural Council, were guests at the meeting.

Details as to plans for schools will be announced soon.

1960 Ginners of Year Named by States

State ginning associations are selecting their 1960 Ginner of the Year and their nominees for the Horace Hayden Memorial Trophy, presented annually to the National Ginner of the Year by National Cotton Ginners Association.

To date, the following states have chosen outstanding ginners:

Alabama-Florida—H. E. Donaldson of Opp.

Georgia—P. R. Smith of Winder.

North Carolina—W. J. Long, Jr., of Roanoke Rapids.

South Carolina—H. R. Drake of Blenheim.

Oklahoma—M. L. Williams of Elk City.

Texas—Peary Wilemon of Maypearl.

The Cotton Gin and Oil Mill Press will publish biographical sketches of each 1960 Ginner of the Year as information is received.

In the case of Peary Wilemon, Texas Ginner of the Year, the information was published on Jan. 7 in a feature article.

• Memphis Board Elects Coors

GILES A. COORS, JR., Fred Lovitt & Co., was elected president of Memphis Board of Trade on Jan. 14. He succeeds Harry D. Tobias of Goldenrod Oil Meal Sales Co.

Elected vice-president was Leonard F. Dienell of Allied Mills, Inc.

Directors chosen were Tobias, W. R. Flippin of Buckeye Cellulose Corp., Jack Z. Gordon of Continental Grain Co., H. Maney Heckle of Heckle Brothers, Cary Humphries of Cargill, Inc., W. K. Martak of Southern Cotton Oil Co., James W. Phelan of Mitchell, Hutchins & Co., and H. O. Toler, broker.

1961 Edition

Ginners Red Book Published

Texas Cotton Ginners Association has published the 1961 Ginners Red Book.

This directory lists gins in Texas, Arizona, California and New Mexico and contains other information useful to anyone associated with the ginning business in the Southwest. Copies may be obtained for $25 from Texas Cotton Ginners Association, 3724 Race Street, Dallas.

In Dallas

Esteve Heads Exchange

F. Javier Esteve, vice-president of Esteve Brothers & Co., has been elected president of Dallas Cotton Exchange.

A. Starke Taylor, Jr., Starke Taylor & Co., was named vice-president.

■ **R. M. HUGHES, Greer, S.C., longtime leader in cottonseed processing, enjoyed visiting with friends at the recent Production-Mechanization Conference.**

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With The All New

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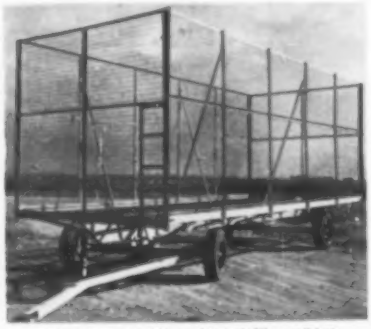

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For Cotton Pullers
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- ★ 6-bale capacity of machine-picked cotton.
- ★ Unique single beam construction.
- ★ 1 x 2—14 gauge fabric wire sides and floor; galvanized for maximum protection.
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- ★ 12,000 lb. capacity (depending on tires used).
- ★ Side boards easily removed, and 4 wagons can be stacked on one for transporting behind a pick-up.
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- ★ Trails perfectly and easily.
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in lots of 5 or more,
Complete
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Bed, Chassis, Floor, Tires, Tubes . . .
"Ready to Roll."

TERMS AVAILABLE FOR GINNERS
Regular Financing or
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In San Joaquin
Irrigation Water Low

Water storage in California's San Joaquin Valley is at low levels, federal-state agencies report.

Above normal precipitation will be needed this spring to prevent shortages of water for 1961 cotton and other crops.

Canvas Awnings Promoted

Using the theme, "It's a Good Deal To Sell Canvas Awning," National Cotton Council and Canvas Awning Institute sponsored an exhibit at the National Swimming Pool Institute meeting in Dallas during January. Fisher Rhymes and Marion McAuley of the Council were in charge of the exhibit.

Safflower Oil Used

USDA Develops Frozen Salad Dressing

USDA is developing a salad dressing that will not separate if it is frozen and thawed.

Safflower oil, fresh egg yolks and rice flour are used in a mixture that has remained stable when frozen to 10° Fahrenheit, but zero temperature stability is the goal of researchers.

■ **L. G. BLACK, president, Ark-Mo Plant Food Co., who also has ginning interests, has distributed a clever and amusing "Progress Report" about his firm. Illustrations and text parody elaborate reports issued by many companies.**

• Williams Re-elected In North Carolina

W. S. WILLIAMS, JR., was re-elected president of North Carolina Cotton Promotion Association on Jan. 16 at the annual meeting in Raleigh. (Williams is author of the article on Page 12 of this issue.)

F. H. Heidelberg is executive vice-president of the state organization working in behalf of cotton.

Hervey Evans, Jr., was elected vice-president; and T. H. LeCroix was re-elected treasurer.

Approximately 350 producers and other cotton industry representatives attended the Raleigh meeting.

■ **W. W. DEUPREE, Anderson, Clayton & Co., was elected first vice-president of Memphis Cotton Exchange, as HUGH FRANCIS, Hugh Francis & Co., became president, succeeding BERRY B. BROOKS.**

In Arizona
Eastland To Speak

Senator James O. Eastland of Mississippi will be a guest speaker Feb. 21 at the annual meeting of Arizona Cotton Growers Association in Phoenix.

Executive Vice-President E. S. McSweeney says that another guest speaker and discussions of Association activities will be on the program.

■ **S. L. KOPALD, Jr., HumKo, Memphis, has been elected a director of Union Planters National Bank.**

• States Urge Farmers To Release Acreage

CHECKING against possible loss of cotton acreage, states throughout the Belt, in special meetings and news releases, are urging farmers to release unused acreage.

• ALABAMA held a state-wide cotton meeting at Auburn University recently where regulations governing release and reassignment of cotton acreage were reviewed. Research developments and the state's educational program also were discussed.

• MISSISSIPPI cotton leaders have launched a drive similar to last year's which resulted in reapportioning about 182,759 acres. Officials estimate the 1960 campaign added $25 to $30 million to the state's economy. The Mississippi program was outlined by B. F. Smith in the Jan. 7 issue of The Press.

• NORTH CAROLINA promotion is discussed in detail on Page 12 of this issue.

• SOUTH CAROLINA growers, told that approximately 100,000 more acres could have been planted in 1960, are being cautioned to take steps to protect their allotments. Clemson College Agricultural Economist Dr. M. C. Rochester has stressed that there are farms in almost every county where farmers want to grow cotton and can grow it profitably.

■ **EZRA TAFT BENSON, former Secretary of Agriculture, has been elected a director of Corn Products Co.**

Thanks . . .
For Last Year's Business

We know that some of you did very good and some bad —and are still having weather problems—but this year's crop is soon to be on the way . . . so another year.

Basically we are army surplus dealers and Poly Glick irrigation tubing manufacturers. We just purchased a number of new DeVilbiss steam cleaners with stainless steel coils from the government, which we offer at only $450. They will generate 100 gallons of water to steam per hour.

Then we also have new Alemite 50 pound capacity hand-operated lubricating bucket pump with 10'—⅜" I.D. hose for only $35 (cost government $127).

Have most sizes in gasoline, diesel and electric motors; chain hoists, light plants, draglines, bulldozers, trailers, tools, tarps, 4" flex-steel tubing, etc.

Plenty of nets with camouflage for cattle, turkey, hog, or building shade, and those without for Poly holddown, cotton holddown, cargo separation, etc. Drop us a line or come and see us—and bring your fishing poles.

Write for List

GLICK TWINS

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PICTURED HERE are some of the leaders who will participate in the Southeastern Gin Suppliers Exhibit in Atlanta in February. The picture on the left shows, left to right, Georgia Ginners Association officers: P. R. Smith, president, C. W. Connell, first vice-president; and Tom Murray, executive vice-president. Alabama Association President H. E. Donaldson and Oscar Hipp, first vice-president, are in the photo on the right. Carolinas Ginners Association is the third participating group.

In Atlanta, Feb. 6-7

Ginners' Exhibit Plans Completed

MORE EXHIBITS than last year, and a program of addresses on topics of current interest to ginners are scheduled for the Southeastern Gin Suppliers Exhibit, Feb. 6-7 at the Biltmore Hotel in Atlanta.

Carolinas Ginners, Alabama-Florida Ginners and Georgia Ginners Associations will meet concurrently with the Exhibit. Tom Murray, executive vice-president of the Alabama-Florida and Georgia groups, is in charge of the arrangements.

E. M. O'Tuel, president of Carolinas Ginners Association, will preside at the opening session on Monday morning, Feb. 6. Exhibits will be installed on Saturday and Sunday, with registration starting at 2 p.m. Sunday.

Speakers at the Monday morning session will include Georgia Lieutenant Governor Garland Byrd, who will welcome the visitors. P. R. Smith, president of Georgia Ginners Association, will respond to his welcome.

U.S. Senator Richard B. Russell and Alabama State Senator R. G. Kendall are scheduled to speak.

Separate meetings of the state associations will be held Monday afternoon. Room 6 has been reserved for the Alabama-Florida group, Room 1008 for Georgia Ginners and Room 1010 for Carolinians.

Tuesday's Meeting

H. E. Donaldson, president of the Alabama-Florida Association, will preside Tuesday morning.

Ernest Carpenter, textile mill executive from Greenwood, S.C., will speak.

A panel discussion on current problems is being arranged for Tuesday morning. Panel members will include C. A. Harvin, president of National Cotton Ginners Association; W. A. Ellis, Jr., an Alabama cotton producer; John Sanders, Pure Food and Drug Administration; and Jim Luscombe, USDA Southeastern Ginning Laboratory.

Southeastern Ginners Council, which sponsors the exhibit, will meet on Tuesday afternoon.

Entertainment

The annual banquet, followed by dancing, will be held Tuesday evening in the Georgian Ballroom. There will be a guest speaker.

A complimentary breakfast for the ladies will start at 9 a.m. Tuesday in Room 1015.

At Markets

Swamped by Soybeans

Trading in soybeans, including speculation by the public, has swamped firms on the Chicago Board of Trade recently.

A staff article in The Wall Street Journal on Jan. 13 told of commodity firm employees working steadily for 39 hours to keep up with soybean trading. Soybean trading was switched to the wheat pit to handle the volume, which reached new highs.

• Oilseeds Institute Plans Program

INTERNATIONAL finance problems, the fats and oil outlook and other timely discussions will highlight the annual convention of the National Institute of Oilseed Products.

B. T. Rocca, Jr., of Pacific Vegetable Oil Corp., San Francisco, reports that the Jan. 26-28 convention at the Ojai (Calif.) Valley Inn will include representatives from U.S., Europe and the Philippine Islands.

Keynote speaker will be J. Howard Craven, senior economist, Bank of America, San Francisco, who will discuss international finance problems.

Aspects of the world and U.S. fats and oil pictures will be outlined by Walter W. Sikes, director, Fats and Oils Division, USDA Foreign Agricultural Service; and James E. Thigpen, director, Oils and Peanut Division, USDA Commodity Stabilization Service.

Cotton Textiles

Unfilled Orders Drop

Mills' unfilled orders for cotton textiles on Dec. 1 were the lowest in two years, American Cotton Manufacturers Institute reported.

National Ginners To Meet with Louisiana-Mississippi Group

NATIONAL COTTON GINNERS Association has accepted an invitation to meet with Louisiana-Mississippi Ginners Association in the historic Vicksburg-Natchez area during the week of March 20.

The exact dates and details of the meeting will be announced soon, according to C. A. Harvin, Jr., Summerton, S.C., National Association president.

J. H. Williams, Natchitoches, La., is first vice-president of the national organization; Garner M. Lester, Jackson, Miss., is a past president; and many other ginners in the Midsouth area have been active in nationwide programs of the ginning industry.

With Mississippi's centennial observance of the War Between the States underway, the convention site is expected to be especially attractive to wives and families of ginners in other states, Louisiana-Mississippi Association officials point out. They urge ginners to make the National Association meeting a vacation trip, and promise special entertainment features, as well as a business program of practical value to any ginner.

Arrangements for the meeting will be discussed at a gathering in Memphis on Monday morning, Jan. 30, when ginner delegates and officers and directors of the National Association will meet at a complimentary breakfast. (See related article in this issue.)

YOU ARE CORDIALLY INVITED...

to visit the Hardwicke-Etter exhibit in Atlanta's Biltmore Hotel while attending your annual meeting and the big Southeastern Gin Suppliers' Exhibit, February 5-6-7.

HARDWICKE-ETTER COMPANY, REPRESENTED BY CEN-TENNIAL COTTON GIN COMPANY, IS NOW SERVING GINNERS IN ALABAMA-FLORIDA • GEORGIA • NORTH CAROLINA • SOUTH CAROLINA • EAST TENNESSEE • VIRGINIA

The important benefits of the Hardwicke-Etter system of *THINSTREAM* Ginning are now available in your section of the Belt through Cen-Tennial Cotton Gin Company, of Columbus, Ga.

Drop by our exhibit while in Atlanta. We think it will pay you to learn more about Hardwicke-Etter *THINSTREAM* Ginning and the fine ginning components that make this superior system possible. Hardwicke-Etter and Cen-Tennial representatives will be on hand to answer your questions and make you welcome.

THINSTREAM! The system that measures up to your needs like no other!

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ALL YOU NEED TO KNOW ABOUT GIN MACHINERY
HARDWICKE-ETTER COMPANY • SHERMAN, TEXAS
Southeastern Sales: Cen-Tennial Cotton Gin Co., Columbus, Ga.

National Cotton Council Photos

SOME OF THE COTTON LEADERS who were in Greenville, S.C., for the Beltwide Cotton Production-Mechanization Conference, Jan. 11-13, are shown in these pictures. At the registration desk, in the picture on the left, are Warren E. Garner, USDA Cotton Ginning Laboratory, Clemson, S.C.; Dalton E. Gandy, National Cottonseed Products Association, Ruston, La.; and J. A. Mullins, Tennessee Extension ginning specialist, Jackson. A group of South Carolina producers and ginners is pictured at the right, as they made the tour of textile mills. Left to right are: Charles Plowden, Henry Everett, D. Leslie Tindal and C. A. Harvin, Jr., all from Summerton. Harvin is president of National Cotton Ginners Association.

Production-Mechanization Problems Discussed at Beltwide Conference

MEETING AT THE CENTER of the South's textile industry — in Greenville, S.C. — the 1961 Beltwide Cotton Production Conference concentrated upon production and processing practices to assure quality fiber for best results at the mill door.

"Cotton grown for highest loan value without regard to spinnability," warned Fred B. Dent, Mayfair Mills president, "points ultimately to abdication of the crop."

But, George S. Buck of the Council staff told the Conference, no matter how much anyone wants to preserve and improve quality, the job "can't be done without knowing what quality is."

Furthermore, USDA's John E. Ross added, "textile mills and consumers must be willing to pay" for quality.

More than 600 cotton research, extension and industry representatives participated in the Jan. 11-13 Conference, sponsored by the National Cotton Council and cooperating groups. Headquarters were at the Poinsett Hotel. Many of the registrants went on a tour of nearby textile mills.

The following papers which were presented at the sessions will be reprinted and distributed by the Council as the official Summary-Proceedings of the Conference:

Opening Statement

J. D. Hays, Chairman, Conference Steering Committee; Alabama Farm Bureau, Huntsville.

We are fortunate that the textile center of the world—the Southeast—has been chosen as the site for this second Beltwide Cotton Production Mechanization Conference. As the program unfolds, I think we'll see that the planning committee has done an excellent job of capitalizing on the unusual opportunities provided by this setting.

I'm especially pleased that arrangements have been made for a tour of mills in the area. This tour will give us a better understanding of mill operations and problems, particularly as they are affected by cotton quality.

I think we'll agree that this is certainly a worthwhile objective. After all, mills are cotton's primary customers. Cotton has to get through the mill door before it can move into retail channels. And the more we, who depend upon cotton for livelihood, can learn about mills and what they need in a fiber, the better job we can do of providing them a desirable raw product for their business.

Quality is no stranger to conferences on production and mechanization. It has been emphasized in the past—and justifiably so. There have been discussions of what quality means to mills—what quality mills want in a fiber and why they want it—and other related subjects. These presentations have been excellent and I'm sure those of us who had the opportunity to hear them learned a lot.

But in addition to hearing newest ideas concerning these subjects today, we'll actually observe and study cotton spinning and weaving. We'll also see bleaching, printing and finishing. As we observe these processes and hear them described, we'll be able to better understand why quality is so vitally important. Since synthetic fibers also will be spun, we'll get a first-hand look at the performance of our competition.

Any questions will be cleared up just prior to the tour by John Wigington of the American Cotton Manufacturers Institute. Mr. Wigington and ACMI are to be commended for their effort in making the tour possible.

I don't mean to infer that our program is to be devoted entirely to quality. Cotton must also be competitive in price. And this surely means we must search out and exploit every opportunity for cutting production and handling costs.

During the course of this meeting we'll hear the discussions of ways to do this through improved use of agricultural chemicals, and better control of insects, diseases and weeds. Current practices as well as new developments that hold promise for the future will be discussed.

As the program develops around the theme "ways to cut costs and improve quality," I think we'll see some real possibilities for improving the competitive position of cotton fiber and the profit position of cotton producers. Certainly we've already come a long way—and fortunately so. But we can't rely on past programs to meet future problems. We have to keep moving. And we can if we'll get behind our research programs to bring them up to really adequate levels and if we'll develop educational programs to get the information where it's needed.

Before going ahead with the program, I would like to pay tribute to the five technical groups which have been meeting for the last two days. The groups include entomologists, engineers, physiologists, the Cotton Disease Council, and the Cotton Improvement Conference. Much of the information reported during this conference will have originated in these technical sessions.

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Stationary Louver MEAL COOLER

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cools with natural air!

- Simplest, most efficient meal cooler on the market
- Ideal for soy bean, cottonseed or any type meal
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- Lowest first cost—easy to install
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Compact — only 11' high x 3'6" wide (6' at drive) and 17' long. Easily installed indoors or outdoors.

It's simple! Efficient! Economical! Meal is gravity-fed through screened chutes as cooling air passes through louvers to reduce meal temperature by as much as 85° to 120°. Low in cost. Shipped assembled — easy to install with only four foundation bolts. Thoroughly tested. Proved by far your best buy for continuous cooling of any meal.

Contact your French representative or write for complete information and prices.

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THE FRENCH OIL MILL MACHINERY COMPANY
PIQUA, OHIO U.S.A.

Quality Requirements of Cotton Mills

■ **Fred B. Dent, President, Mayfair Mills, Arcadia, S. C.**

Cotton quality elements needed by mills are as important to spinning and weaving as are weather and fertilizer to the cotton producer, or as machinery to the ginner. We could do a job without them, but not a competitive or acceptable job.

When mills talk of cotton quality elements, they refer only to "spinnability" of fiber. This characteristic has no relationship to traditional government standards for grade and staple.

Competition Is Keen

Cotton fabrics are in a continuing struggle in textile markets of this nation —and the world—for orders in competition with fabrics made from man-made fibers and paper and plastic products. The continuation of the King Cotton era upon which so many of us depend for a livelihood, is related solely to maintaining markets for cotton fiber.

At the turn of this century over 90 percent of the fiber consumed in this country was cotton. Today this has fallen to about 65 percent. This decline can be arrested through cooperative action by all interested parties and well directed research at each level throughout the industry.

Next Conference At Memphis

The 1962 Beltwide Cotton Production-Mechanization Conference will return to Memphis, where the meeting traditionally is held in alternate years. Preliminary meetings of associated committees and groups will start on Jan. 8, with the Conference sessions continuing through Jan. 12. The Peabody will be headquarters.

Research and fiber technology have far exceeded grade and staple classifications for directing ginners and producers to the most desirable fiber characteristics. This is proven by the now famous Joanna Mills spinning test which showed that the direct labor mill cost of spinning a poorly ginned Middling cotton could be reduced by 47 percent in going from a properly ginned Low Middling Plus grade. The combined net cotton and labor cost obtained by such a change of fiber qualities was a reduction of 20 percent.

Current chemical finishes applied to cotton fabrics to impart characteristics which make them competitive with man-made fiber fabrics, frequently cost twice as much as the unfinished fabrics. A converter of fabrics must have faith in the fabric he buys before making such an investment in an expensive chemical finish. Such faith is founded on fibers with characteristics of good spinning value, not on the aesthetic values ascribed by government classification.

What Do Mills Need?

■ STAPLE LENGTH—First, mills need cotton fiber of adequate staple length. This term also means uniformity of length. Prior to mechanization of harvesting and ginning, "classer's call" of staple length was the controlling index. Mills have now found that two other measures are useful and important. These can be determined by instruments.

1. Upper half mean length
2. Percentage of fibers one-half inch and shorter.

Staple length controls the size yarn a mill can produce as well as the length of the yarn. Without adequate strength in its component yarns, a fabric is unmerchandisable in this period of critical inspection. Efficiency and mill costs also are directly related to uniformity of staple length.

Mills have found that both of these indexes are higher at gins which prevent over-drying and over-machining. Consequently, they are aware of gins' equipment, and screen offerings on moisture and short fiber content. A moisture content of less than five percent is a danger signal, as is a short fiber content of 12 percent.

■ FINENESS — Another characteristic mills generally check is fineness as measured by the Micronaire. For economical operation and uniform, high quality products, control of micronaire is essential . . . And man-made fibers are 100 percent uniform which affords challenging competition.

To obtain required micronaire limits, mills seek territories which can satisfy their needs, and focus buying there. They also specify certain micronaire limits in

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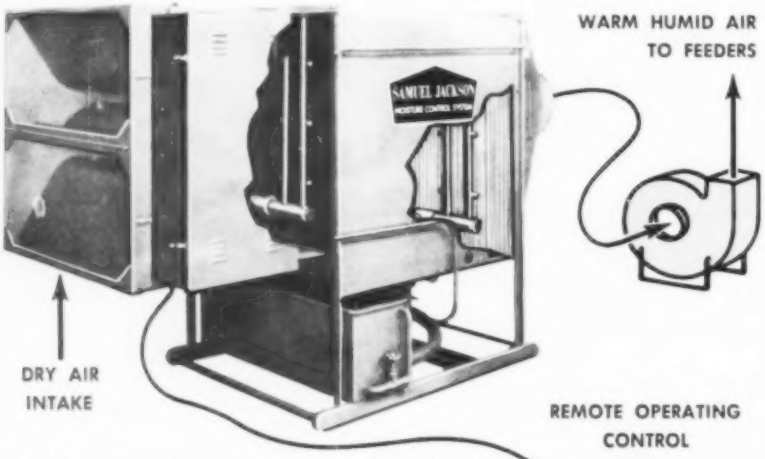

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purchasing from shippers, thus forcing them to do the same.

Control of neps and uniformity of yarn strength are seriously affected by micronaire. Micronaire also controls to a large degree cotton's affinity for absorbing dyes. Non-uniform blending of cotton can cause unacceptable variations in dyed yarns and fabrics.

■ FIBER STRENGTH — A third characteristic sought by mills is fiber strength. A strong chain cannot be fashioned with weak links. So it is with yarns. They are no stronger than the fibers from which they are spun. Today's chemical finishes demand even stronger fabrics, which requires good yarns. So, you can readily appreciate the importance of this characteristic.

To obtain proper fiber strength, mills search the belt for cotton with adequate "Pressleys" before buying and specify limits in contracts with shippers.A break of 80,000 pounds P.S.I. or greater is satisfactory for most fabrics.

■ UNCONTAMINATED — The fourth characteristic sought by mills is a catch-all category we might call "uncontaminated." This means free from harmful effects of disease, insect damage and contaminants sprayed by man.

The disease referred to is a fungus infection, found particularly in the rain grown areas, known as Cavitoma. This insidious infection can cripple mill operation and raise costs to a staggering degree if contaminated cotton is not fed very sparingly into a mix.

To avoid Cavitoma, cotton mills buy from areas not afflicted . . . It will be a great achievement for rain grown areas when a strain of cotton is bred free from susceptibility to this fiber disease.

Insect damage to fiber is found in the form of excretion known as honey dew, which is found in irrigated areas. Fibers so damaged stick to processing machinery to the detriment of efficient mill operation and quality yarns.

When mills find this in an area they curtail purchases there in favor of areas free of honey dew.

Contaminants sprayed by man include defoliants, additives and oils from pickers and gins. These cause fibers to process improperly to the detriment of cost, quality and saleability of yarn or fabrics. Mills simply cannot afford to purchase cotton in areas where such malpractices are prevalent.

Can Be Controlled

These are the four main cotton quality elements related to spinnability that mills seek in purchasing cotton. All are subject to control through research at the breeder level, proper selection of seed by the grower, improved harvesting techniques and controlled ginning.

For the sake of strengthening cotton's position, we spinners urge segments of the industry active in areas relating to these matters to rededicate your research activities and to call upon us for cooperative efforts where desirable. Through such efforts consumption of cotton can be stimulated permanently. With constantly improving products we can not only hold markets, but expand them.

Cotton grown for the highest loan value disregarding spinnability is nothing more than a plea for charity and points ultimately to abdication of King Cotton in favor of a monarch who will work for his people rather than riding on their bare backs!

The challenge, resources, knowledge, opportunity and need are before us. Let us renew our determination to join hands and move forward in concerted action for the well-being of the American cotton industry.

Cotton Quality in Perspective

■ **George S. Buck, Jr., Assistant to the Executive Vice-President for Research, National Cotton Council, Memphis.**

The ultimate solution of the quality problem will depend on the industry's attitude toward that problem. That's why it's so important to place it in true perspective.

The expression used so much the past six or eight years—"gin damage"—can be very misleading. Of course there is such a thing as gin damage—there always has been. But we can't consider only what happens to cotton during ginning to affect its spinning performance and strength and appearance of yarns. While that is a part of the problem it's not all of it. And the problem is such that we cannot solve it piecemeal.

A quality problem is inherently associated with all technological advances in growing, harvesting, ginning, and merchandising. A quality problem also is inherently associated with the advancing efficiency of mill operations, particularly spinning. We must look at the whole picture to get the right answer.

Suppose nothing had changed in production, harvesting, and ginning. Also suppose mills had not made advances they have in higher spindle speeds, higher drafts, and bigger yarn packages. We still have a quality problem. Higher yarn tensions associated with increased spindle speed, bigger rings, or heavier travelers would inevitably show up differences in cottons not apparent to the classer, and which would not have been detected by less advanced and less exacting spinning conditions.

I am not saying this is a mill problem. I am not saying the problems in this case would be the same as those we are having today. I am pointing out that changing technologies in cotton spinning, which have evolved concurrently with changes in production, harvesting, and ginning, have certainly intensified the quality problem associated with the latter.

So, the cotton quality problem is obtaining dependable performance and value, regardless of technology. It is also the problem of preserving those inherent qualities which make cotton a good spinning fiber and a valuable consumer product.

National Cotton Council takes the position that anything that adversely affects the performance of cotton, or the confidence of our domestic and foreign mill customers in American cotton, is very serious. With the competition cotton faces, no other position would be conceivable.

Complaints Are Legitimate

We have looked carefully into mill complaints here and abroad. We are convinced they are based on facts. We know they have been widespread. American cotton cannot hold its present domestic and overseas markets with anything less than the maximum of its inherent quality, properly identified in the market place.

We have tried to get a more specific measure of the occurances and quantities of "problem" cotton. This is difficult when you lack real measures of quality. However, available data do shed some light. This information lends optimism on the quality of the bulk of our cotton.

An analysis of USDA's annual cotton quality surveys from 1946 to 1959 shows: Five percent increase in strength, a one-third drop in non-lint content, no deterioration in color, and nearly constant length. Cottons have become a little finer, but are in the desirable range. Until recently the trend in length uniformity was upward.

This means our cottons have not gone to pot. In some ways they are getting better.

In other respects, however, there is room for concern. The past 15 years yarn appearance index has trended steadily downward. While at least a part of this can be explained by shifts in varieties, some of the trouble might be due to changing technologies of harvesting and ginning.

Another disturbing indication is the decline in fiber length uniformity and yarn strength the past four years.

Problem Indicator

But these weighted averages don't give enough information about the quantity of cotton which fails to live up to expectations. One factor many consider an important indicator of "problem" cotton —short fiber content—will help us be more definite of this.

The AMS reports for 1960 on Cotton Fiber and Processing Test Results include both Suter Webb and Digital Fibrograph measurements of short fibers. While the relationship between the two measurements of fibers shorter than one-half inch is not very good, most cottons fall into what mills have defined as a fairly reasonable range of short fibers—14 percent and under. However, some show up with 25 percent or more fibers less than one-half inch. Evidence indicates that these cottons can cause a gret deal of trouble for some mills.

Data furnished by a number of mills indicate that most cotton does not contain an abnormal quantity of short fibers. However, a big shipment of questionable cotton occasionally shows up. One mill found 10.5 percent of 12,000 bales of 1-1/16 inch cotton contained more than 14 percent fibers one-half inch and shorter. In another lot of 10,000 bales of one inch cotton checked by the same mill, about 45 percent of the bales had a short fiber content above 14 percent, and 17 percent of the bales had a short fiber content of 18 percent or more.

However, high short fiber content may prove no disadvantage under certain mill processing conditions. Other factors can outweigh the influence of short fibers. There also is considerable natural variation in the short fiber content of cottons. Shorter staples normally have more fibers under a half inch than longer staple cottons Short fiber content, by itself, is not the final answer.

In other words, we simply don't have a quantitive measure of the quality problem because we can't yet adequately identify problem cottons. Test data indicate that most of our cottons are good.

The buyer who does the best job of quality identification will have the least trouble from problem cottons.

What should we be looking for in research? What can happen to cotton in harvesting and ginning—and early stages of mill processing?

Fiber Breakage

First and most obvious is fiber breakage. A certain amount of fiber breakage occurs in all mechanical processing. In general, fiber breakage increases as the cotton is dried, and as the number and severity of mechanical operations increases. Fiber breakage increases the short fiber content and shortens the effective staple length.

Data from a privately conducted harvesting-ginning test in Texas last year show that fine fibers obviously break more readily than coarse ones.

Other changes also can occur in the fiber. Its extensibility can be reduced by mechanical working and overdrying, making it more brittle. Cracks and fractures can be introduced, making it more subject to breakage. The waxy content of the fiber surface can be changed, conceivably in a way that can affect inter-fiber friction and cohesion. Fibers can be curled, twisted, and tangled into neps.

Each of these has already been demonstrated by research. The problem now is to sort them all out and determine their relative influence on processing and yarn quality.

Trash Content

Another quality effect with which we must be concerned is what happens to trash—leaf and seed particles, etc. Evidence indicates that leaf particles, reduced in size through mechanical action, are harder to remove during mill processing than the same quantity of leaf in larger particles. Thus two cottons having the same grade index may produce yarns having significantly different leaf or trash content. This is particularly serious for mills which sell grey goods. It is therefore a greater problem in Europe because of less vertical mill integration.

Yardstick of Quality

The more we learn about quality, the quicker we can solve the quality problem. Chances seem excellent that we can characterize cotton with about five property measurements. These could be used either as a supplement or substitute to the cotton classer's evaluation. Likely measurements are:

■ FINENESS—Measurement of fineness has already been pretty well worked out. It can be applied to each bale. Mills have now learned more about using fineness measurements and adapting both fine and coarse cottons to mixes. While we can improve present test methods and present knowledge of fineness, the biggest part of this job is done.

■ LENGTH—Cotton classers are quick and reasonably accurate, but they tend to become subjective about staple length. Biggest shortcomings of classers' staple is, however, that it doesn't provide adequate information on fiber length distribution. Short fiber content isn't the final answer to quality, but it is very important. Something bigger than classers' staple is badly needed.

The Digital Fibrograph is fast and informative, but not always as accurate as we would like. New methods for measuring short fibers are under development, and one is now commercially available. Research being sponsored by a number of organizations, including our own, points to the ultimate availability of a length and length distribution test which, like air-flow methods for fineness, can be applied to every bale.

■ STRENGTH — It is still not certain that a fiber strength test on every bale is necessary. For merchandising it would be desirable; strength tests from composite samples may serve most mill purposes.

Present strength testing methods are not rapid enough to be applied to each bale. They also could stand improvement in dependability and accuracy. Automatic strength measuring methods, rapid enough to be applied to each bale, may follow not long after that for length measurement.

■ TRASH CONTENT and Trash Character—Visual examination of trash doesn't provide enough information, and isn't sufficiently dependable. Scanning methods may eventually tell enough about both trash content and character. However, it may prove necessary to actually remove the trash from cotton, not only to measure content, but also for ease of removability. The Shirley Analyser is too slow, and only measures total content. Some progress has been made on methods to measure content and character.

■ QUALITY "X"— It's too early yet to tell whether this can be one measurement, or whether we must measure several "X" qualities. Certainly neps are important, but so far we don't have a good way to measure neps in raw cotton. Color may be of some significance. Surface frictional character seems a good possibility.

Do we need all of these measurements to solve the quality problem?

Very likely we do, to solve it. If mills are to avoid problem cottons, they need to identify them. And if mills are to get the maximum from any cotton, they need to know as much as possible about all of its properties. They need to understand how these properties will affect their processing operations and their yarns and fabrics.

And naturally the producer and ginner can't do the optimum job of supplying quality cottons until they know what quality is. When top quality gets the top price, we will have all the incentive needed to produce quality cottons.

But we don't want to wait until we get this whole job done before making progress, before improving our cotton. With information we now have on effects of overdrying and overmachining, progress has been made. Ginners have paid much more attention to moisture control, seed cotton grouping, and preventing overdrying. Producers are taking greater care in picking cotton clean and dry, so less drying and machining are needed.

Over the Hump

There is much encouragement for the belief that we have passed the quality "hump". Educational programs are paying off. Our entire industry is quality conscious, and that state of mind itself will give tremendous boost to all quality preservation and improvement efforts.

But understanding cotton is still the key. No matter how much each segment of the cotton industry wants to preserve and improve quality, the job can't be done without knowing what quality is. And to buy and sell cotton on one basis, while expecting performance on another, seems unthinkable.

The cotton quality problem, viewed in its true perspective, boils down to the problem of true quality identification. When that concept is finally accepted by our industry, the quality problem will be well on the way to being solved.

Report on Quality Evaluation

■ **Dr. W. T. Pentzer, Director, Market Quality Research Division, AMS-USDA, Washington.**

Spinning has been completed on the following experimental lots of cotton during the 14 months that the Clemson Pilot Spinning Laboratory has been operating:

California Test

The 1958 California test was a cooperative project with the Shafter, Calif. Experiment Station, the Agricultural Extension Service, local producers and ginners, and USDA.

A total of 16 bales (four-bale replications) were used in these drying and cleaning tests. Extra drying, using outlet temperatures of 201 degrees F. and inlet temperatures of 260 to 270 degrees F., resulted in 8.1 percent short fibers (one-half inch or less) as compared with 7.1 percent in cotton dried with ambient air of 26 percent r.h. and 95 degrees F. Normal drying, 180 degrees F. outlet and 230 degrees F. inlet, had 7.5 percent short fibers. The extra drying before ginning resulted in yarn of a lower break factor than normal or ambient air drying. In spinning, ends down averaged 42 per thousand spindle hours as compared with 30 and 31 in the cottons not subjected to as much drying.

The conclusion from this test was that low temperature drying or no heat at all was preferable to extra drying. Lint cleaning had little effect on fiber properties and spinning performance. A full report has been prepared for publication by the Agricultural Marketing Service.

Robinsonville Test

The 1958 Robinsonville test was a ginning-spinning study made in cooperation with the Stoneville, Miss., ginning laboratory. In this study were 42 bales of cotton, 36 machine-picked and six hand-picked. The 36 bales comprising three-bale replications were ginned under 12 gin conditions representing elaborate and moderate overhead cleaning, high and low moisture and none, one and two lint cleaners. The six bales of hand-picked cotton composed of three-bale replications were ginned under two extreme conditions: (1) low moisture, elaborate overhead and two lint cleaners, and (2) high moisture, moderate overhead and no lint cleaners.

Ends down for the 40's yarn ranged from a low of 26 per 1,000 hours, average of three lots, in both of the hand-picked lots, to as high as 71 average in one of the high moisture lots of machine-picked cotton. Spinning performance was significantly better in the low moisture lots (2.0 to 3.0 percent at the lint slide) than in the high moisture lots (5.0 to 9.0 percent). The only lot with high moisture that spun well was the hand-picked lot. The percentage of short fibers less than

one-half inch was greatest in cotton exposed to the greatest amount of gin drying, as was anticipated. This was true of both hand-picked and machine-picked.

For some unexplained reason, spinning performance was better in the cotton exposed to more drying, having 10.3 to 12.6 percent short fibers, than in the cotton exposed to less heat, having short fibers ranging from 8.5 to 10.3 percent. A report of the spinning tests and correlated fiber properties is being prepared. Weaving of this test will be undertaken this year by contract with Clemson.

Oil Contamination Tests

Oil contamination was investigated as a possible cause of the unexpected spinning performance of the low moisture cotton in the Robinsonville tests, but no positive evidence was obtained. A separate small spinning test on oil-contaminated cotton was inconclusive because of excessive variability of cotton used.

Stoneville Tests

The 1958 Stoneville study consisted of 31 half-bale lots, made up of 29 machine-picked and two hand-picked lots. The standard gin treatments were simple, moderate and elaborate overhead cleaning, low, medium and high moisture at the lint slide and none, one and two lint cleaners. Two machine-picked lots were ginned with moderate overhead and one lint cleaner, but one lot was to be dried to very low moisture and the other to very high moisture. Hand-picked cotton was exposed to the lightest and most severe gin treatments used for machine-picked cotton. Spinning tests were made with 40's yarn at 11,000 r.p.m. for 5,500 to 9,000 spindle hours.

As expected, ends down increased with greater severity of gin treatment. Of the six lots of highest ends down, ranging from 48 to 83 per 1,000 spindle hours, four were low in moisture (2.4, 2.7, 2.9 and 3.8 percent). Of the six lots with lowest ends down, ranging from 16 to 35 per 1,000 spindle hours, five were high moisture lots with moisture contents of 6.5 to 7.2 percent. Percentage short fibers were generally lower in lots with good spinning performance and higher in the poorer spinning lots.

California Studies

The 1959 California studies were essentially a repetition of the California Tulare County tests, known as the Joanna tests, in which lint cleaning and gin heats are compared. Cottons had good spinning qualities, calling for spinning some 50's yarn in order to get into a sensitive ends down range. The data coincides with that of earlier tests — ends down are associated with increased short fibers and higher gin heats. Spinning was completed in October, but tabulation of fiber properties has not been completed.

Stoneville Studies

The Stoneville studies, begun in 1959, are a large study of Mississippi Delta cotton, with 93 bales ginned under controlled heat, lint cleaning and overhead cleaning. Spinning was started in October and will be finished in May.

1960 Crop Studies

Largest study undertaken in 1960 is with New Mexico cotton to determine the effect of two levels of drying and three levels of cleaning on cotton harvested at three stages of maturity or fineness. Approximately 60 bales are involved. Tentative plans call for combing instead of carding, spinning 40's and 50's yarn, and carrying the studies through weaving.

A second study with 1960 cotton includes tests on the effect of defoliants and insecticides on spinning performance and fiber properties of cotton. A third test originated at the USDA Ginning Laboratory at Clemson and is a cooperative project with Clemson to find if cotton moisture at the gin, using three different drying temperatures, 140 degrees, 187 degrees, and 234 degrees F., suffered any damage to quality as judged by spinning and measurable fiber properties.

A fourth test on Mississippi Delta cotton compared three different kinds of harvesters and hand-picked lots on possible effects on cotton quality.

Several contracts made or under negotiation relate to the program of the Pilot Spinning Laboratory. First, we have a contract with Clemson to do weaving studies on cotton we want to carry beyond the spinning stage. Yarns from the Robinsonville study are now on hand for weaving. A contract for combing the cotton in the 1960 New Mexico studies is being drawn up with Clemson.

Studies on finishing and spinning performance and fiber properties of color grades of cotton from the Texas Plains area will be done at Texas Tech under contract. Additional spinning tests with some of the 1960 experimental lots of cotton are contemplated to lighten the

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load on the Clemson Spinning Laboratory.

We have a contract with Harris Research Laboratories of Washington, D.C., to study samples of cotton from our experimental lots of known production and ginning, heating and spinning performance. They are working on density of some of these overheated cottons and on repeated stressing of single fibers. We also have a contract with the Virginia Institute for Scientific Research in which various microscopic techniques are used to study the structure of individual fibers from cottons of known history, or purposely damaged. Another exploratory contract with Fabric Research Laboratories involves tests on tensile strength of single fibers.

Effects of Harvesting and Ginning on Quality

■ **John E. Ross, Agricultural Economist, AMS-USDA, Clemson.**

The first study processed at the pilot spinning plant, Clemson, S.C., was a ginning study to determine the effect of normal drying, no drying, and excessive drying, in combination with two conditions of lint cleaning on fiber properties and spinning performance of Western cotton.

Cotton was machine-harvested under ideal conditions at the Shafter, Calif., Experiment Station and ginned at a nearby commercial gin with standard overhead cleaning. The effect of these treatments on most fiber properties was insignificant at five percent moisture. Only number of fibers shorter than one-half inch and co-efficient of variability as measured by the Suter-Webb Sorter were affected by excessive drying as compared to normal drying and no drying.

Under normal drying, yarn break factor was significantly reduced by use of two lint cleaners (one was the saw type). Excessive drying caused a highly significant decrease as compared with other drying conditions, with or without lint cleaners.

Spinning performance was unaffected for all conditions except excessive drying. This correlates very closely with the short fiber content and yarn break factor except that the latter was more sensitive to lint cleaning.

Middling grade was obtained from drying with no lint cleaning, and grades of Middling Plus were obtained from all other conditions. Excessive drying did not produce higher grades and it appears that lint cleaners added the half-grade benefit. Even when no drying was used, lint cleaners produced equivalent grades. However, with present premiums and discounts, it is questionable if a half-grade increase in the Middling range will result in a net income in value to the producer. In fact, with a premium of 35 points for Middling Plus over Middling, a producer would lose about 20 to 50 cents a bale because of weight loss. If excessive drying were added, this would be increased an additional $1 per bale.

Non-lint content of Middling cotton was higher in the ginned lint stage when compared with Middling Plus grades, but there was no difference after mill cleaning.

"Re-Discovering"

Most important finding of this study, in the opinion of many, was "re-discovering" the relative effect on fiber properties and spinning performance of ambient air at 90-100 degrees F. with low relative humidity and use of artificial heat to dry cotton. With outside temperature at 95 degrees F. and relative humidity at 26 percent, moisture of lint in seed cotton was reduced from 6.4 percent to 3.8 percent. This compares with use of one drier with inlet and outlet temperatures of 230 degrees F. and 182 degrees F., respectively, on cotton having an original moisture content of 5.9 percent to reduce the moisture to 3.4 percent. This drying level was considered normal. Approximately 41 percent of the original moisture was removed in both instances.

In ambient drying, the original 95 degree air was raised to 113 degree because of friction and temperature rise across the fan and resulted in a decrease of the relative humidity from the original 26 percent to approximately 15 percent. The equilibrium moisture content of lint cotton in 15 percent relative humidity air is about three percent. You can see the tremendous drying effect.

This same situation occurred in 1959 on another test in the same area when it became necessary to cut off all artificial drying on machine-picked cotton having an original moisture content of approximately nine percent to achieve a final level of five percent lint moisture. Ambient air conditions were in the same areas as those described for 1958. In the 1959 test, Middling grade was attained with two lint cleaners, regardless of whether drying was at five, four, or three percent lint moisture content, or whether elaborate or moderate overhead seed cotton was used in combination with any of these drying conditions.

A recent article indicates that use of such information is now bearing fruit. A Western cotton leader stated that "the ginning schools and quality research conducted during the past two seasons . . . . have resulted in marked improvement in ginning. Some ginners, who up to two years ago thought it was not possible to operate without some heat, have used none so far this season and are getting better gin turnouts and grades fully equal to the past two years."

Lots Provide Basis

Since mechanization, it has been generally accepted that, based on fiber properties, there were no significant differences in hand and machine-picked cotton. These results have been presented in various papers giving research results of the past 15 years. In 1938, the Pilot Plant Working Committee, directed that when possible, tests should include hand-picked lots to be compared with machine-picked cotton. Lots were to provide a basis for what might be termed maximum in quality which was initially present.

Two tests containing such cotton were conducted in that year. Each test contained a lot of three replications of hand-picked cotton which received minimum gin treatment while an identical lot received the maximum cleaning and drying.

In one study, the results indicate that the Ends Down Per Thousand Spindle Hour (EDMSH) count on hand-picked cotton, with minimum treatment, was at a level of 17. This compares with a range of 38 to 47 EDMSH where overhead and lint cleaners were varied but where lint moisture of about seven percent was comparable to that for the hand-picked lot. When moisture in machine-picked cotton was reduced below that generally recommended (down to 4 percent and 2.8 percent) the difference became slightly greater.

When hand-picked cotton received maximum cleaning at a low moisture level of about 2.3 percent, EDMSH was 38. Even this wasslightly below that for machine-picked cotton receiving minimum treatment.

Hand-picked cotton, ginned at high moisture level, had slightly more short fibers in the ginned lint than did machine-picked. This is to be expected since hand-pickers are not generally selective in the seed cotton that is harvested. However, short fiber content of the card sliver from the two harvesting methods indicates that, although this factor increased for both cottons because of mill cleaning and carding, hand-picked cotton contained almost two percentage points less short fiber than did machine-picked. Other tests are being conducted to determine whether these differences can be substantiated and to develop possible leads which may indicate reasons for differences if they exist.

What About Spinnability?

Another test on 1958 cotton was conducted in the same area where the two methods of harvest could be compared, along with a rather complete analysis of the effect of drying and cleaning practices on machine-harvested cotton. It was found that, on 40's yarn, the ends-down level for hand-picked cotton was 26 as compared with 52 for machine-picked cotton where both types were ginned at a moisture level of slightly above six percent with moderate overhead seed cotton cleaning and no lint cleaning. When maximum cleaning and drying were used, the ends-down level for machine-picked cotton was reduced to 36, while that for hand-picked cotton remained at 26 EDMSH. Thus, it appears there may be some difference in the way hand and machine picked cotton spin.

In this study, there was a complete reversal of effect of drying on ends-down. As more drying was applied (in this case the moisture level of the over-dried cotton was about two ond one-half percent as compared with approximately six percent for the high moisture cotton), the ends-down level was lower. This occurred despite the fact that short fibers increased and yarn break factor decreased.

Research contracts have been let to determine whether there was some surface property of the cotton that was affected by use of chemicals and that might explain the reversal. It appears that perhaps some contaminant caused more damage to spinning performance than did excessive heat, and that this heat had driven off the contaminant. This would explain better spinning performance for the excessively dried cotton. It could be that other factors are involved, and only more intensive research efforts will uncover and assign proper relationships to them.

Many elements that effect cotton quality may not be indicated by grade. Certainly, partial evidence indicates that, in some cases, abuses in ginnng may not be the sole reason for bad spinning performance. It appears that problems in mechanization may be much more complex and more difficult to solve. Grade and even more common fiber property measurements do not tell us specifically

how cotton will perform in the mill or give us a measure of its "utility" value.

In research to measure the effects of any production, ginning, or manufacturing practices on cotton quality, it is important to understand what is involved. Spinning procedures can be geared to measure cotton quality so that no differences occur. For instance, spindle speeds, amount of twist applied in spinning, and size of yarn spun can all affect results. If we assume that a standard organization produces no differences, some might say quality was not affected. Yet, the removal of twist, or spinning a slightly finer yarn, will produce significant differences. Therefore, quality is affected, although it may not be apparent at today's organizational standard or technological environment.

Progress is being made in production, manufacturing, and utilization. If breeders continue to contribute to quality as they have over the past 30 years, and that quality is delivered to the mill door, it is highly probable that we will see cotton being used in constructions and counts that we dared not believe possible. This has actually happened at some mills in their so-called custom-ginning operations last year. Such an approach is negative in evaluation—refraining from certain practices to preserve something we cannot identify or measure objectively. Yet this is the case today.

What Price Quality?

This raises the question of just what is the customer willing to pay for to get quality? Is price the fundamental yardstick of measurement? We believe not, because in the long run one probably gets about what he pays for. Is it grade, when there has been great emphasis for a better system of measuring and evaluating quality? Is it having just those qualities that are needed for today's level of operation in today's constructions? We do not think it is any of these.

We believe the mill and the consumer must be willing to pay for those qualities that are inherent in cotton and are constantly being improved, if advantage is to be taken of technological progress and increased demand for fiber. As in finished goods, top quality commands a premium. It is equally true with the raw product. This premium may be in terms of dollars, in reputation, and in ease of moving a crop to market or it may be a combination of many things. The important thing is that both producer and consumer understand problems, capacities, potentials, and competitive nature of the segment in arriving at a quality-price mechanism that will assure the expansion of the entire cotton industry. And our research is aimed at providing at least some of the basic information necessary to help the whole cotton industry move forward.

Panel Discussion | Current Major Objectives in Breeding for Quality

Dr. Henry D. Barker, Panel Leader, Chief, Cotton and Cordage Fibers Research Branch, ARS-USDA, Beltsville, Md.

Western Area:

John H. Turner, Director, U. S. Cotton Field Station, Shafter, Calif.

Breeding high quality fiber has been a major objective in the far western cotton states for many years. Years ago, these states produced Acala strains, which were well adapted to irrigated conditions. Fiber quality, however, was inferior to better varieties then produced under rain-grown conditions.

Fortunately for the reputation of far western cotton, the New Mexico Experiment Station developed an Acala 1517, which had excellent fiber properties. This variety was not well adapted to the lower cotton-growing valleys of Arizona and California, but proved to be a valuable parental type for improving the quality

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of Acala strains adapted to the far west.

Our current objectives embrace specific plant, fiber and seed traits associated with quality. These specific objectives are now based upon clear concepts of components of quality which breeders have attained in recent years.

• **Specific Objectives** — Now to present more clearly our current objectives for improving cotton quality:

DIRECT ESTIMATES OF FIBER QUALITY

These are traits which can truly be measured in terms understandable to almost any group of cotton people:

■ FIBER LENGTH—To satisfy the diversified requirements of the textile industry, our western breeding programs have developed varieties of 1-1/16 inch to 1-1/8 inch staple. Recent efforts have been to increase this another 1/32 inch. At the breeding level this implies the need for fibrograph U.H.M. values to range from 1.13 to 1.20, whereas 1.09 to 1.16 were previously sought.

■ LENGTH UNIFORMITY — Perhaps of even greater significance is length distribution of fibers in a sample. We are striving for a uniformity ratio of 85 percent as calculated from fibrograph measurements. A rapid and accurate means of determining "short fiber" content is very much needed to enable breeders to make greater progress in developing length uniformity.

■ FIBER STRENGTH—The Stelometer has been found to give fiber strength index figures which are closely correlated with yarn strength. Using 1/8 inch gauge reading of 2.00 to 2.10 grams/grex for Acala 4-42, we consistently find that merchants obtain fiber srengths of 90,000 or more pounds per square inch and these bales perform as predicted in the spinning mills. In our California breeding program we are selecting for T1 readings of 2.15 and above.

■ FIBER FINENESS — Whether we use the slower arealometer or the more rapid micronaire instrument for determining fiber fineness, the best response from spinners has come from samples ranging from 3.8 to 4.6 micronaire units. Future varieties with added length may be increased in micronaire value to the advantage of both growers and processors.

Each of the above fiber measurements are important individually, but when considered in combination a more accurate estimate of spinning performance has been obtained.

One-half pound spinning evaluations at Knoxville, Tenn., and the AMS Laboratories at Clemson, S.C., and College Station, Texas, evaluate carded and combed yarn spinning performance on five and eight pound samples taken from the outstanding progenies and preliminary strains.

INDIRECT CONTRIBUTORS TO FIBER QUALITY

We believe several quality advancements are likely to be made in this realm during the 1960's.

■ CROP MATURITY — An intensive program of selection has been under way to develop strains which would allow machines to begin harvest 10 to 12 days earlier than has been possible. To accomplish this without loss of yield, two-thirds of the bolls should be open when harvest begins. Hence, the boll maturato: (a) higher percentage of bolls detion period as well as fruiting time and rate have a direct bearing on time of harvest. When this is accomplished, the consumer will receive better fiber due veloped under optimum environment for desired fiber length and strength; and (b) the reduced time open cotton is exposed to weathering in the field.

■ PLANT FEATURES — Improvements in three distinct characteristics are being sought within our advanced breeding material; (a) an erect or rigid stem to minimize plant lodging, thus allowing machines to pick cotton easier and with less foreign matter; (b) vertical or upright fruiting branches with boll arrangement that will reduce both shattering of cotton to the ground and number of partial locks left on the plant; and (c) a reduction in leaf and bract foliage to minimize boll rots and to contribute to more effective defoliation.

■ DISEASE AND INSECT TOLERANCE — The importance of verticillium wilt tolerance in western cotton production has been recognized for many years. Outstanding varietal improvement over the past 15 years has resulted in yield increases of 25 percent or more on many wilt infested soils. It is becoming evident from current pathological and entomological research that plant tolerance or resistance to several diseases, insects and crop pests could aid tremendously in producing more profitable yields and harvesting higher quality fiber and seed. Specifically, western breeders are teaming with research personnel to develop even higher degrees of tolerance, possibly even immunity, to verticillium wilt, bacterial blight, nematodes, spider mites and other pests.

■ BOLL AND SEED FEATURES—Structure, size, and shape of the cotton boll and its manner of opening materially influence "pickability." Furthermore, ginning and spinning are affected by the seed fuzz pattern and seed coat toughness. Shorter seed fuzz permits faster ginning and lessens the likelihood of some fuzz being removed during ginning. Attention is also given to selection of seed tips that are not easily removed during ginning. The most recent objective in seed quality is the elimination of gossypol carrying pigment glands.

■ PLANT TOLERANCE TO ADVERSE CONDITIONS — Western cotton growers have adopted many diverse management practices to push yields higher and higher. This has prompted breeders to strive for broader varietal adaption. Combining in one variety the genetic factors for maximum yield that are of primary interest to the grower and those that result in highest quality fiber is no easy task for a research team. For example, western variety must perform under these extremes: Growing where soil alkalinity is high and water penetration poor, and where costly cultural-management practices include excessive applications of fertilizers, fungicides, insecticides, irrigation water and other "additives".

• **Progress to Date**—In California we have used two sources of germ plasm to obtain superior fiber properties.

Twenty or more years of scientific breeding and research underlie our most advanced experimental strains. These strains were derived from intensive hybridization and selection within Acala combinations involving either Hopi or Tri-species hybrids as a parent. Acala Hopi crosses date back to work in the 1930's in Arizona nd followed up in California. Acala Tri-species hybrids began with development of Triple Hybrid lines in North Carolina, with further crossing in Georgia and then combined with Acala at Shafter in the early 1950's.

Some 10 years ago several high strength lines derived from these combinations in breeding programs were tested. It was evident that superior spinning performance was possible from such cotton, but yield per acre records indicated only 70 to 80 percent of the commercially acceptable varieties could be expected. Many disappointments and complex associations have been encountered as breeders have continued the work to combine extra fiber quality with agronomically suitable strains of cotton.

Most encouraging is the fact that lint yield of some high quality strains has equaled that of our standard variety while maintaining a number of improved plant and fiber qualities.

Let me emphasize, that these improved Acala strains are not perfected for release this season. A few minor refinements are expected in the next generation. At the same time, seed increases will be grown and more extensive tests conducted to determine the best composite of families or sib lines for use in the Foundation Seed release.

Southeastern and Mid-South Areas:

■ **Dr. J. Winston Neely, Vice President and Director, Plant Breeding, Coker's Pedigreed Seed Co., Hartsville, S. C.**

For accuracy, I have asked representatives of commercial breeders, federal field projects, and state experiment stations of the Southeast and Mid-South to list breeding objectives. Consequently, I will be speaking as a representative of these workers.

There is complete agreement that the overall objective is to develop a cotton variety having the best fiber characteristics and milling qualities that can be combined with high yield, disease resistance, and adoption to modern production, harvesting, ginning, and manufacturing methods. This means they do not expect to develop, through breeding, a practical variety that possesses the maximum in fiber properties. However, they have succeeded in developing well balanced varieties with fiber of, for most end uses, sufficient qualities. They are confident they will be able to not only maintain this quality but to continue to improve it without loss of desirable agronomic characteristics.

There is also general agreement that breeding emphasis should be placed upon tensile strength, short fiber content, and mill performance. There is a feeling that, with the exception of "speciality" cottons, requirements for such charcteristics as staple length and micronaire have been met and that maintaining them should be sufficient. For most breeders, breeding for quality is not confined to fiber, but is extended to include increased value of seed and the extended uses for seed products.

• **Tensile Strength** — Breeders of the Southeast and Mid-South recognize the

challenges to expend every effort possible to develop varieties with high tensile strength and have geared their programs accordingly. All practical improvement made in the inheritable tensile strength in the area has been a result of re-selection within established commercial varieties or within progenies of intra-upland crosses. "Strong-fiber germ plasm" in other species—wild, semi-wild, and cultivated—is recognized and considerable work has been done in progenies of inter-species crosses and crosses between subspecies. However, no variety from these wide crosses has been released for extensive planting.

Since there is renewed interest in extra strong cottons, breeders have stepped up efforts, and some have advanced increases of high-strength strains resulting from selection within progenies of inter-species crosses. For example, breeders are increasing a strain with yield, gin turnout, staple length, and wilt resistance equal to our commercial variety and tensile strength that is perhaps 25 percent higher.

• **Short Fiber Content**—Buyers and mill operators have expressed considerable concern over the high percentage of short fibers in certain growths. Unfortunately, it is very difficult to separate effects of genetic factors, environmental influences, and processing damage on this characteristic. In addition, the breeder lacks a practical method of measuring short fiber content of the large number of progenies he must study. However, he is aware of the problem, and is searching for needed techniques and apparatus. He also is using the improvised methods at his disposal to eliminate strains with excessive short fiber content in an effort to develop a cotton characterized by an inherent low short-fiber content and by fiber qualities that result in resistance to field deterioration and processing damage that might increase percentage of short fibers.

• **Grade** — One of the greatest concerns of growers is poor grades. They realize that quality of ginned lint is frequently affected by the presence of leaf and bract trash. This offers another challenge and another plateau of research to the breeder.

Non-commercial cottons with certain characteristics produce lint with less trash than commercial varieties now being grown. Smooth leaf is one of these characteristics. Leaf fragments of the smooth-leaf stock do not cling to the lint as tenaciously as hairy-leaf fragments of commercial varieties. Smooth leaf fragments also are easier to remove by cleaning.

Most breeders have made crosses with commercial varieties and smooth-leaf stocks. While they are still encountering obstacles in efforts to develop high yielding, high quality, disease resistant cottons with smooth foliage, breeders have very promising stocks and are confident they will be releasing cottons of this type in the near future.

• **Seed Quality** — Breeding for improved seed quality is another objective of several cotton breeders of the Southeast and the Mid-South. This is being approached mainly from two angles: Seeking varieties with low-gossypol oil content and varieties with "hard-seed."

Researchers in North Carolina, Texas, and California have isolated stocks of non-commercial cottons with very low gossypol content. Seed of some stocks actually contain no gossypol. Meal from seed of these stocks is not harmful to hogs and poultry as is meal of commercial varieties which are characterized by gossypol toxicity. Transferring this characteristic, which is genetic in nature, is slow, but several breeders are devoting considerable effort toward developing a low gossypol commercial cotton.

Deterioration of seed in the field, especially in some humid locations or during wet seasons, results in considerable losses. Certain non-commercial cottons are characterized by "hard-seed" which are affected far less by ambient moisture than are seed of commercial varieties. Incorporation of "hard-seed" into commercial varieties naturally would be desirable. Several breeders have made crosses between high yielding, high quality stocks and "hard-seed" stocks and are selecting for desired recombinations. Of course, consideration must be given to the necessity for treatment prior to subsequent planting that would render the seed permeable or that would break the dormacy of seed so germination can occur.

• **Mill Performance** — Cotton breeders have learned a lot from their association with fiber technologists, buyers, and mill superintendents. For example, they have learned that while mill operators may talk about tensile strength, short fiber content, micronaire, grade, or other single properties, they are actually interested in performance. They are interested in the effect of raw cotton properties on the quality of finished goods, but their immediate concern is how the cotton "runs" in the mill. Consequently, breeders are attempting to learn all they can about mill performance of cottons. We try to translate "single-factor" properties into expected mill performance. However,

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we go farther by having large numbers of miniature spinning tests made annually. A few of us have put bale lots of new strains through the mills and are looking forward to the use of the pilot spinning laboratory at Clemson. Surely these tests will result in still better quality in the cottons that come from our programs.

• **Indirect Approach** — In an effort to make quality improvement programs more productive, breeders are taking indirect approaches to the problem. In addition to their attempts to increase length uniformity, tensile strength, micronaire, yarn strength, etc., they are following such approaches as: (1) obtaining difficult combinations of quality and yield by selecting for components of yield rather than for the complex character of yield per se, (2) development of varieties resistant to diseases, nematode-complexes, and insects that affect plant growth and in turn fiber development; (3) development of varieties that produce fiber resistant to physiological and pathological deterioration in the field, and in the bale; (4) development of varieties that produce fibers that are damaged less during picking, ginning and manufacturing; and (5) development of varieties that are affected less by adverse growing conditions, such as periods of excessive rainfall or drought or of exceptionally low or high temperatures.

• **Conclusion** — Breeders of the Southeast and Midsouth have done a good job in improving and maintaining cotton quality. This interest will be continued as they expand their efforts every possible way to insure the quality mills need.

Plains Area:

Dr. Harold D. Loden, Geneticist and Manager, Paymaster Farms, Plainview, Texas.

Primary objective of breeding must be to keep cotton competitive. Any program not geared to this objective must be considered weak.

The producer is the most important individual in cotton production. If cotton breeding objectives hinder profitable production, efforts for quality improvement of lint or seed may never be realized commercially. Therefore, an improvement in quality of cotton or by-products must be incorporated into commercial varieties with no reduction in yield or net income.

• **Yield Comes First**—Yield is the primary factor in economic cotton production. In our competitive economy, all varieties grown in commercial quantities have the necessary genetic complex for high production. Every variety grown today has, at some time, recorded yields of two or three bales per acre. Varieties fail to express yield potential under certain conditions because yield potential is the interaction of variety and environment.

The number one West Texas-Oklahoma problem (yield and quality) is associated with diseases. This includes effect of seedling disease and diseases of the growing and mature plant. Angular leaf spot (or bacterial blight) and verticillium wilt are the two major problems affecting yield in the area. These diseases affect the quality of both lint and seed. Therefore, in breeding for quality in the Plains area, a primary objective must be to incorporate genetic resistance to seedling diseases, angular leaf spot, and verticillium wilt.

Varieties resistant to angular leaf spot are rapidly becoming available, and in the near future we can expect practically all of the West Texas-Oklahoma acreage to be planted to them. This will affect yield and quality, particularly as reflected in spotted and light spotted grades due to boll infection by the blight organism.

The outlook on seedling diseases and verticillium wilt is not as bright. Extensive work is being done to obtain varieties with tolerance, if not resistance. The major drawback presently is lack of genetic seed stocks with resistance to these diseases.

Providing varieties with bolls suited to mechanical harvesting is another major objective of Plains area cotton breeding. Several varieties, which are excellent in yield and quality are now "passing out of the picture" because they are not adapted to machine harvest. Likewise, some varieties which leave much to be desired in yield or quality, but which are well suited for machine harvest are being grown in increasing quantities. A variety should have adequate storm resistance for stripper or spindle picker harvest.

The restricted growing season of the Plains has, for years, forced production of cotton with an average staple of less than an inch. This may not be the case today. Apparently, some breeders have broken the linkage between short staple and early maturity. A manner of varieties are in initial production stages which could permit a considerable portion of the West Texas-Oklahoma production to be 1-1/32 inch and 1-1/16 inch staple. This is of major importance to the producers in the area because of increased gross income, and because production in the area will be more competitive. In the immediate future I believe varieties will be grown in the area which could eliminate the stigma that West Texas is a "short staple" area.

The Plains area also has been criticized for producing a large quantity of fine, immature fibers. Material presently in initial production stages should correct this situation as a result of combining the stormproof boll character into strains which also have adequate fiber development.

The same has been generally true for strength. I'm sure breeders in the area have as their minimum objective production of lint having 80-90,000 pound Pressley.

• **Key Is Disease Resistance** — In summary, the primary objective must be higher per acre income in order to protect the interest of the producer. The main way this can be accomplished is developing varieties resistant to diseases which currently limit yields on large acreage in West Texas-Oklahoma. Production of disease resistant varieties also will increase lint and seed quality. Experimental varieties are available in breeding programs which will permit, within the not too distant future, the general production of varieties having 1-1/32 inch and 1-1/16 inch staple, 4.0 or better micronaire, and 80-85,000 pounds strength. These important fiber properties will be incorporated into improved varieties without sacrificing yield.

Breeding programs may be farther advanced than merchandising channels. Solution of this problem should not be placed entirely on the shoulders of breeders. True value of such varieties can be best attained through efforts of producers as well as buyers, shippers, and spinners of Plains area cotton.

Cottonseed quality must be considered in keeping cotton competitive. Until recent years, it has been impossible for breeders to consider improvement of cottonseed quality. Of primary importance is the current availability of genetic material which may be incorporated into breeding programs to reduce or eliminate gossypol.

It is not anticipated that release and widespread production of such varieties will result in a major increase in price of cottonseed. The most important point is that cottonseed meal will have universal usage and be competitive with soybeans and other vegetable protein. Information to date indicates that it is possible to incorporate this character into commercial varieties without detracting from production, disease resistance, fiber quality, etc. Those working with this problem believe this objective is possible and will soon be realized.

I have tried to outline the most important objectives in breeding for quality cotton in the West Texas-Oklahoma area. I probably have painted a rather rosy picture. However, cotton breeders serving the area believe that these objectives will be realized in the near future.

What Affects The Use of Chemicals on Cotton?

Dr. H. L. Haller, Assistant to Administrator, Farm Research, ARS-USDA, Washington.

Agricultural chemicals have been used almost since the beginning of time. Sulfur was used to control insects as early as 2000 B.C. In the early years of American agriculture we got along fairly well with very few chemicals. However, with the development of new crops and the intensification of agricultural practices, insect populations have increased and have become more difficult to control. Cotton growers, for instance, are especially aware of the difficulty of controlling the boll weevil, the bollworm and other cotton insect pests.

With the research knowledge gained to meet the needs of World War II came new and improved agricultural chemicals. Today, many different kinds of new and improved chemicals are used in all phases of agriculture. The use of pesticides, insecticides, herbicides, fungicides, and others has become accepted practice on nearly all cotton farms. In fact, benefits from these chemicals helped our agriculture problem more than any other segment of our civilization and economy.

However, use of pesticides does not provide unmixed blessing. Many are also poisonous to man; some leave residues; that, in part, is why they are good. But this does not necessarily mean injury will result to man and domestic animals when pesticides are used in the quantity and manner recommended. An important question to be considered is the extent of the hazards presented by pesticides. In the U.S. the score or so of accidents attributed to pesticides are statistically insignificant when compared to the four million home accidents causing approximately 28,000 deaths annually. But this

does not mean that pesticide users can be complacent—precautions must be observed.

Proper and safe use of agricultural chemicals is of deep concern to the Department of Agriculture. This concern begins with the research man who studies a chemical's usefulness and extends through to the time the chemical becomes an instrument for farm production.

A Constant Search

We are constantly pressing for more effective and safer pest controls. We seek to provide the widest possible margin of safety to consumers of agricultural commodities, to fish and wildlife, and to other national resources in areas subjected to treatment. At times it becomes necessary, in making recommendations, to weigh benefits against possible adverse effects.

Why then are some people questioning the use of agricultural chemicals in production of cotton and of food? Just what are our problems and what is the U.S. Department of Agriculture doing about them?

There is no simple answer to these questions. But we can look at the broad picture, and then break it down into its component parts.

In creating the Department of Agriculture in 1862, Congress defined in broad terms the function to be performed —"to acquire and diffuse useful information on subjects connected with agriculture in the most general and comprehensive sense."

Acquisition of useful information is accomplished through research. This is aimed at developing knowledge, first to find prompt answers to more pressing problems, and second, to provide a broader background of understanding—through basic research—from which more lasting solutions may evolve.

The diffusion of new knowledge is through Department and State Experiment Station publications, and the Agricultural Extension Service.

As time passed, Congress gave the Department many new functions and responsibilities, other than research and education. Some of these have a direct bearing on your industry.

For example, as new chemicals are introduced into our farming operations, consumers must have assurance they are used intelligently, and that harmful residues will not remain on food reaching the market place. The problem is to derive the full benefit from chemicals without harm to anyone. And that brings us to the matter of regulations.

Regulatory Programs

In fulfilling its responsibility to the consumer, the Department of Agriculture is responsible for administering a number of regulatory programs dealing directly with production, processing, and marketing agricultural products.

These are:

■ The Meat Inspection Act of 1906, which assures consumers a supply of safe and wholesome meat food products.

■ The Agricultural Marketing Act of 1946 which provides—in addition to research and marketing programs —certain standards in marketing agricultural products.

■ The Federal Insecticide, Fungicide, and Rodenticide Act of 1947. (A revision of the Insecticide Act of 1910)

■ The Poultry Products Inspection Act of 1957, which provides protection for poultry products similar to those of other meat products.

■ Public Law 86-319 of 1959, which extends coverage of the Federal Insecticide, Fungicide, and Rodenticide Act to include nematocides, defoliants, desiccants, and plant growth regulators.

In addition, Agriculture was assigned certain specific responsibilities under Public Law 83-518, commonly referred to as the Miller Amendment to the Food, Drug, and Cosmetic Act. This amendment provides for establishment of safe tolerances for pesticides that may remain in the form of residues, in or on raw agricultural commodities at time of harvest. Under the Amendment, cottonseed has been determined to be a raw agricultural commodity.

The first law passed by Congress dealing with insecticides was in 1910. This was known as the "Insecticide Act." It was a simple labeling law designed to regulate the few products then in use, such as Paris green, lead arsenate, nicotine, and bordeaux mixture. Enforcement of the Act consisted primarily in testing the ingredients of the insecticides and fungicides, to make sure the composition and quantity of the product were as stated on the label. Failure to comply with the Act was cause for seizure of the shipment or prosecution of the shipper.

During the next 37 years, many chemicals were added, and formulations became much more complex. By the end of World

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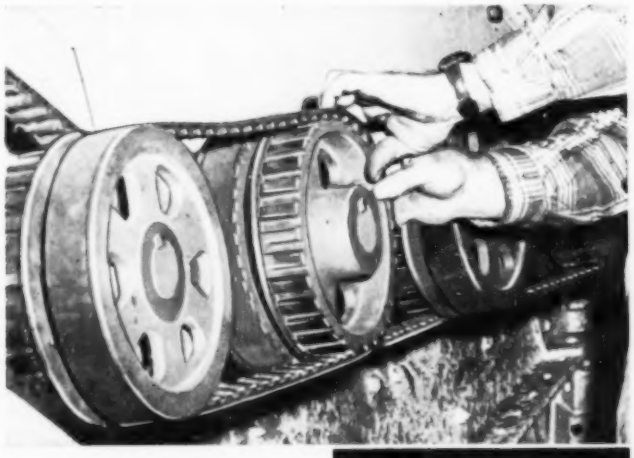

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War II the original Insecticide Act was obsolete.

In 1947, the Act was amended by passage of the Federal Insecticide, Fungicide, and Rodenticide Act. The more important changes included broadening the scope of the law to include herbicides, rodenticides, sanitizers, and disinfectants.

In addition, registration of a label was required before a pesticide was offered for shipment interstate, thus shifting emphasis to prevention of violation, rather than depending upon seizures of adulturated or falsely labeled products.

The label also was required to include adequate precautionary information to protect the user and the general public.

When applying for registration, the pesticide manufacturer is required to furnish pertinent information on composition of the material, rate and timing of application, and precautionary measures to be observed.

When use on food crops is involved, the amount of residue—if any—remaining is also required. If residues are present, registration is delayed until tolerances are established.

Facts Are Reviewed

The facts presented when registration of a label is applied for are then reviewed by Department of Agriculture chemists, entomologists, pharmacologists, plant pathologists, herbicide specialists, or bacteriologists, as the case may warrant. State experiment stations and other laboratories outside the Department are consulted when necessary, to make use of all available information.

The latest change in this law was in 1959, when the scope of the Act was extended to include nematocides, plant regulators, defoliants, and desiccants.

As I mentioned earlier, USDA has, by law, certain responsibilities to fulfill under the Food, Drug, and Cosmetic Act, administered by the Department of Health, Education, and Welfare. In 1954, Congress enacted P.L. 83-518, frequently referred to as the Miller Bill. This amendment established specific procedures to be followed in setting safe tolerances when chemicals, regulated by the Insecticide Act of 1947, are used to protect food or feed crops. It also covers those products added to the Act by amendment in 1959. Of course, if a product is evaluated and recognized as safe, a tolerance or exemption is not required.

To set the tolerance procedure in motion, the Department of Agriculture must certify to the Food and Drug Administration that the chemical has a useful place in agriculture. The Department must also express an opinion that the tolerance proposed reasonably reflects the residues likely to result when the pesticide chemical is used as directed. So far, more than 220 tolerances for about 110 pesticide chemicals for use on various food crops have been established.

Tolerances are not always established uniformly on all crops. For example, the tolerances for methoxychlor will vary from 14 ppm on apples to 100 ppm on alfalfa. Methoxychlor, like all other chemicals, also carries a zero tolerance in milk. This wide variation in tolerances is because the Food and Drug Administration has set up the following policy: Tolerances will never be set above the safety limit of a specific pesticide but they should also reasonably reflect the amounts necessary to cover the residues likely to remain on the individual crop involved, when the chemical is used in accordance with label directions.

Absence of a tolerance does not necessarily mean a particular pesticide chemical may not be used. When evidence is available to prove that the proposed use of a chemical will leave no residue, the Department of Agriculture registers such products on a "no residue" basis and no tolerance is needed. Under such conditions of use, the Food and Drug Administration may establish a tolerance if a petition is filed but the tolerance cannot be greater than zero.

Often, new chemicals are introduced first for restricted use, which will leave no residue. If later experience shows that under certain conditions residues of the chemical remain, then tolerances must be established. For example, a chemical applied 30 days before harvest may leave no residue, but if used up to 15 days before harvest, a residue may result.

As stated earlier, cottonseed is subject to the Miller Amendment and, therefore, if a pesticide residue is present, a tolerance, or an exemption from tolerance, must be obtained. This is so because cottonseed meal and cake are used as animal feed, and cottonseed oil finds use in oleomargarine and in vegetable shortenings. Legal tolerances have been established for a number of pesticides used in cotton production.

In general, the Miller Amendment, which has now been in effect for more than five years, has worked out even more satisfactorily than had been anticipated by its backers. USDA has worked diligently in this field, from the standpoint of the cooperation contemplated in the Miller Amendment, and in the formulation and control of label directions for use, which, if followed, would result in crops within tolerances. Both the Department of Agriculture and the Food and Drug Administration have preached to farmers the theme of "follow the label—don't use heavier applications and don't apply the pesticide closer to harvest than the label calls for." Where this advice is followed, the grower should have no concern of residues.

Tolerances for Milk

Since cottonseed meal and cake containing pesticide residues, when fed to dairy animals, may contaminate milk, a few words on tolerances for milk may be in order. The present Food and Drug Administration policy establishes only zero tolerances for pesticide residues in milk, but allows tolerances greater than zero for residues of many of the pesticides in other major foods. The Food and Drug Policy is based upon the premises (1) that milk constitutes the sole or major food of infants, young children, and sometimes of the aged and ill, and (2) that these groups may be more susceptible to toxic actions than are others.

Recently the Food Protection Committee of the National Academy of Sciences-National Research Council expressed the opinion that it does not necessarily follow that only zero tolerances in milk are scientifically justified. The Committee further stated:

"Since 1954, the Food and Drug Administration has established over 2,000 tolerances for residues of more than 100 pesticides, in or on a large range of raw agricultural commodities. Most of these tolerances are for residues greater than zero. They were established on the basis (1) that no greater residue need remain if practicable, good production practices are followed, and (2) that the amounts specified are safe. The Committee believes it is scientifically defensible to follow the same criteria in considering safe tolerances for pesticide residues in milk.

"The criterion of safety, of course, is of greatest importance. But residues of pesticides in milk are not per se more hazardous than residues of the same pesticides in other foods. The policy of zero tolerances hinges on the premise that for certain groups, milk is the sole or major item of food and that these groups may be more susceptible to toxic actions than are others in the population.

"As regards the aged and ill, it is unscientific to insist that no residues of particular pesticides remain in milk, if other items of their diet contain residues of the same pesticides. Also to be considered are those aged and ill whose diets are composed largely of items other than milk. A question arises as to why only those aged or ill whose diet is largely milk need thus to be protected. One would not a priori suppose that one of these groups is more su ceptible to toxic actions of pesticides than the other. If pesticide residues in dietary items other than milk can scientifically be adjudged to be safe for these groups, some levels of milk can also be adjudged safe.

"There is no evidence or reasonable basis for presuming that extremely small residues of pesticides in milk are peculiarly hazardous for the infant. In any event, at a few weeks or months of age, the infant is given foods that may contain residues of pesticides. These residues are deemed safe. It is unscientific to insist that, in order to be safe for infants, cow's milk must be absolutely free of residues of pesticides permitted in other foods.

"In accordance with the foregoing, the Food and Nutrition Board (National Academy of Sciences-National Research Council) believe that the present policy that only zero tolerances for pesticide residues in milk can be permitted is not scientifically justified. Regulations would be scientifically sound if based on reasonable judgments assuring safety in the case of small residues that are unavoidable in milk even under the best production practices."

Food Additives

Brief mention may also be in order of the Food Additives Amendment to the Food, Drug and Cosmetic Act passed by Congress in September of 1958.

The term "food additive," as defined in this amendment, does not apply to a pesticide chemical in or on a raw agricultural commodity, such as a growing crop. The amendment requires, however, that the use of any substance which can reasonably be expected to become a component part of any food— or in any way change the characteristics of any food—must be covered by a Food and Drug regulation prescribing how the additive can be safely used. This amendment contains the Delaney "cancer" clause. The Delaney clause states that no permission will be granted to use an additive, if it has been found to cause cancer in man or animals when fed at any level of intake.

Administrative interpretation of this cancer clause has created widespread public fear of pesticide chemicals required to produce our food crops. While no one would propose to use knowingly a chemical that induces cancer in human beings, the unrealistic aspects of the Delaney clause are known to those concerned with research and development.

The Department of Agriculture feels that the Delaney amendment is unneces-

sarily restrictive, a position taken by many scientists, as well as by members of the President's Science Advisory Committee, set up to study food additives. This amendment limits the Secretary of Health, Education, and Welfare in approving the use of certain materials coming within its provisions, whether or not he might otherwise decide that their use might be safe.

A literal interpretation of the Delaney amendment would lead to the banning of any substance that increases the incidence of cancer in test animals, at any level of ingestion. However, traces of certain inorganic compounds—such as selenium —are often found in foodstuffs as they occur in nature. This compound is dangerous in large amounts, and is generally accepted as carcinogenic. Yet many of them are essential nutrient elements at certain levels.

Discretion Must Be Used

The President's Science Advisory Committee arrived at this basic conclusion: Interpretation of the Food Additives Amendment requires discretion because so many variables enter into a judgment as to whether a particular substance is, or is not, carcinogenic.

Chemicals are here to stay. Farmers rely on them to protect crops and livestock from insects, diseases, and weeds, and to increase efficiency of farm operations in many other ways. They are an essential production tool and we have no present alternative to their use.

But we must search for more efficient ways to use them. We must continue to look for new control techniques that can be used alone or with chemicals. And, greater emphasis needs to be placed on the use of chemicals in the weakest link of the life cycle of insects.

In following up every promising new lead, scientists are exploring many challenging areas. They are developing biological controls—including parasites, predators, and insect diseases—that can be substituted for chemicals in sensitive areas. They are looking into the use of insect sterility for eradication. They are studying attractants, baits, lures, and repellents that may be used independently or in combination with toxic materials.

In the meantime, I would like to stress one important fact. No other country in the world has the comprehensive laws and enforcement procedures that we do, to insure the safe use of chemicals for food production and distribution. Many of the newer pesticides used in this country are commonly used in Europe, too.

The past decade has seen the development of the most extensive body of research data on all aspects of pesticides that exists anywhere in the world. Much of this stems from the highly dynamic and progressive nature of the agriculture in this country, and the large and necessary role of pesticide chemicals. It is unlikely that any other country will ever approach the magnitude of our research on this topic. Millions of dollars have been spent on study of pesticides, and millions more will be spent in the future.

All this concentration of research, money, time, and energy has only one objective—to provide a safe and adequate supply of food and fiber at reasonable cost.

It is clear that every effort must be made to inform the public objectively on the provisions instituted to assure a safe and wholesome food supply. The program for pesticide safety endorsed by the Federal Government, implemented by industry and practiced by agriculture, is founded so firmly on logic and facts, and so tempered with extra precaution, that there should be no need even to defend it. It might be more realistic if critics of present-day pesticide use were challenged to accept full responsibility for our food supply, if pesticide usage were to be unrealistically curtailed.

Research shows that pesticides can be used with safety. And it certainly makes good sense to use them safely. Otherwise, prohibitively restrictive legislation may be required to police the few individuals who are not careful in using these materials.

Follow the Label

The label is still the best available source of information on how to use a pest control product on a food crop. The Food and Drug Administration has frequently stated that it has never had to make a seizure of a food, where it could be established that the pesticide was used in accordance with directions.

Our Pesticides Regulation Branch is now reviewing uses of registered labels. In the introduction of the summary being prepared of this review, it will be stated that if new evidence is developed to challenge the validity of a registration, appropriate action will be taken immediately to correct the label.

It would be encouraging to say that the big changes in pesticide control are over, and we have only a few more things to learn before we know all the answers.

But, unfortunately, such is not the case. We are still in a transition period that may last some time. We may, during this period, find new and specific pesticidal chemicals. We may establish tolerances for all useful chemicals that leave residues on foods. And we may find that food production will become an even more precise science than it is today.

Two final points are so important that they cannot be over-emphasized. First, the overwhelming fact that has clearly emerged from the many studies, hearings, and discussions of the past few years is that our foods are safer and more wholesome than ever before, and chemicals used on farms help make them so.

And second, it is vital to keep in mind that the label tells the story. Before using a pesticide, read the label carefully and follow directions.

Thus, it becomes the responsibility of all concerned to work diligently to keep our food supply safe.

Progress in Chemical Weed Control Studies

■ **Dr. Warren C. Shaw, Leader, Weed Investigations, Agronomic Crops, ARS-USDA, Beltsville, Md.**

A basic objective of agricultural research is to develop more efficient plants, soils, and animals and to manage them at high productivity levels.

To produce economic crops, we attempt to utilize all available scientific technology to balance vegetation at a highly productive level. Weed control is a basic, essential and important aspect of this. This is basically an ecological problem.

Weeds are among the greatest contributors to crop production costs. They compete for water, light, and mineral nutrients. Weeds increase cost of labor and equipment, reduce quantity and quality of crops and harbor damaging insects and diseases.

For example, average cost of all tillage in cotton production is estimated at 14 percent of the value of the crop. It is also estimated that at least one-half of this is due to weeds. Additional loss includes 10 percent due to reduced yields, lowered quality, and control costs. Total loss is estimated to $440 million each year. The single most important objective of fundamental and applied weed control research is to reduce these annual weed losses.

Advances in Weed Control

Important advances have been made in cultural, mechanical, and biological weed control methods. Research and farm practice have shown that greatest efficiency results when combination methods are used. While there are no substitutes for proper cultural, mechanical, and biological methods, progress in chemical weed control the past 10 years has been almost fantastic. Many new chemicals and new weed control techniques were developed. Highlights were herbicidal properties of the phenoxy compounds; introduction of pre-emergence control; development of low-pressure, low-gallonage application techniques; development of pre-planting chemical methods; the discovery of the role plants play in changing the structure, activity, and selectivity of herbicides; discovery of effects of surfactants, solvents, carriers and other additives on selectivity, persistence, and fate of foliar and soil applied herbicides and development of subsurface herbicide application techniques, soil incorporation methods, and granular formulations of herbicides.

Herbicide Evaluation Research

Rate of screening, evaluation, and development of new herbicides the past 10 years has almost exceeded the imagination. Present methods of evaluation include application of new chemicals as pre-planting soil-incorporated, pre-emergence, and post-emergence treatments. Advances in experimental application equipment for utilizing extremely small quantities of experimental chemicals and standardization of evaluation techniques gave impetus to the industrial discovery and development of new herbicides. Development of logarithmic application techniques is an outstanding example of designing a research tool to evaluate more accurately, efficiently, and rapidly the herbicidal properties of new chemicals.

Present tendency is to use greater variety of herbicides and to use specific ones for control in specific crops and areas. Rate of development and trends in development of new herbicides offer almost unlimited potential for selective control in almost any weed-crop situation.

An almost inexhaustible supply of chemical energy for controls of weeds in a wide variety of weed-crop situations and specialized areas is provided by NPA, dalapon, amitrole, CDAA, CDEC and others.

New herbicides with great potential for weed control in a variety of situations continue to be introduced at a rate unexcelled in history. Established herbiamiben, barban, and others have pro-

cides plus such new chemicals as EPTC, vided great flexibility in achieving selective weed control in terrestrial and aquatic environments. A large share of the credit for these outstanding developments is due to an efficient, forward thinking, chemical industry working in close cooperation with federal and state research agencies.

Influencing Factors

Numerous factors influence penetration, absorption and translocation of herbicides. Plant form, and leaf shape, position, density, surface, and margins greatly influence foliar distribution, retention, and uptake of herbicides.

Plants with erect, spreading, or prostrate growth habits with broad, large, narrow, and short or linear leaf shapes greatly influence herbicide recipient, distribution, and retention patterns. Plants with upright, horizontal, or pendulous leaves which form foliage canopies of various densities markedly influence retention and uptake of herbicides.

The nature of the leaf surface is critically important. Leaves with waxy, hairy, or variously sculptured leaf surfaces differentially retain and absorb herbicides. Stomate distribution and nature of the cuticle influence quantity of material that penetrates outer layers of the leaf. The permeability barriers of the cell membranes may further decrease amount of chemical absorbed into individual cells.

Form, shapes, size, density, distribution, and other characteristics of roots also partially determine the amount of soil applied herbicide that actually comes in contact with the plant.

Use of radioactive isotopes, gas chromatography, and other modern techniques, is making it possible to obtain improved understanding of uptake and movement of herbicides in plants. Since foliar-applied herbicides move downward primarily in the phloem (living tissue) and soil-applied herbicides upward mainly in the xylem (non-living tissue), all factors which influence plant growth and the transport solutes and water and mineral elements also effect the movement of herbicides in plants.

The differential absorption and translocation of herbicides in different species often account for their selective action.

As we gain a fundamental understanding of absorption and translocation of herbicides in plants, it will be possible to utilize more efficiently this knowledge for development of highly selective chemicals.

In early development of herbicides, primary emphasis was given the chemical and physical properties of adjuvants that would preserve the herbicide in the container during shipment and enhance application with spray equipment. However, in recent investigations, increased emphasis has been given to influence of surfactants, co-solvents, and other adjuvants on the selective action of herbicides on crop plants and weeds. It has been shown that surfactants may enhance the activity of a herbicide on one crop without increasing the activity of the same herbicide on other crops.

Recent investigations showed that surfactant carriers, co-solvents, and other adjuvants in herbicide formulations caused significant effects on the initial and residual activity of soil-applied herbicides.. EPTC formulated and applied in kerosene was less persistent in soils than when acetone was used as a carrier.

These and other studies conducted recently suggest that formulation constituents can be used to tailor-make herbicides for use in specific weed-crop situations.

Mechanisms of Herbicidal Actions

While metabolism and biochemical syntheses of growth factors in plants undobutedly play a significant role in herbicide action, growth controlling properties of herbicides are not necessarily limited to biochemical actions. Physical or chemical effects on cell membranes, spindle fibers, or other subcellular structures may disrupt normal physiological processes of these highly organized cellular components. Most herbicides are known to inhibit many biochemical or physiological processes. Control of plant growth with herbicides undoubtedly results from the accumulative effects of these many biochemical, metabolic, physiological, and physical inhibitions.

In 1947 plant scientists demonstrated that plants could change the structure and activity of chemicals and that nonphytotoxic chemicals could be metabolized within plants to phytotoxic compounds. This resulted in new concepts on selective action of herbicides. In 1954 it was shown that certain plants could metabolize herbicidally inactive (4-2, 4-DB) through beta-oxidation to herbicidally active 2, 4-D. Therefore, weeds and crop plants capable of this beta-oxidation were killed, whereas plants not capable were not killed. This herbicide has shown excellent promise for post-emergence control of broadleaved weeds in (a) cereal crops underseeded with certain forage legumes; (b) establishment of pure stands of forage legumes; (c) forage legume seed production fields; (d) flax; (e) tolerant crop plants such as corn or rice grown in the vicinity of crops highly susceptible to phenoxyacetic and alpha-phenoxypropionic acids such as cotton and grapes; and (f) certain other weed-crop situations.

Recent studies have also shown that plants can produce the opposite effect. Simazine, promising pre-emergence herbicide for weed control in corn, when absorbed by the roots of the corn plant, is converted to a nonphytotoxic form. Therefore, corn shows considerable tolerance to simazine. On the other hand, many important weeds do not effectively metabolize simazine to an inactive chemical. These are highly susceptible to injury and are easily controlled by simazine.

Another fundamental investigation showed that dalapon and several other chloro-aliphatic acids inhibit the enzymatic synthesis of pantothenic acid, a B-vitamin essential to plant growth. Pantothenic acid is made by an enzyme which couples beta-alanine to pantoic acid. This enzyne has been isolated. The herbicides were shown to be competing with panoic acid. The response of plants to dalapon may be due to the temporary inhibition of pantothenic acid synthesis. This was demonstrated by supplying pantothenic acid to barley leaves. The exogenous source of pantothenic acid partly protected dalapon-treated plants against the herbicidal action of dalapon.

Fate of Herbicides

The fate of herbicides in plants represents a dimension in weed control research which must be more fully understood.

Most herbicides can be recovered from plant tissue as the original molecules even though major percentages of the compounds have undergone chemical changes. Consequently, we are not certain of the actual chemical structures through which many herbicides exert their growth-controlling actions. Conceivably some herbicides are applied in one form, translocated in a degraded or metabolized form, and cause inhibitions of growth at the site of action as yet another chemical structure. Other chemicals seem to be absorbed, translocated, and accumulated at the site of action as the original molecules..

Developments

Two recent developments in research on new principles, methods, and techniques may have far-reaching effects on chemical weed control. These include development of (a) subsurface soil-incorporated, pre-planting herbicide application techniques and (b) development of surfactants, carriers, solvents, co-solvents, and other formulation adjuvants which influence initial as well as residual activity of herbicidal chemicals. These techniques provide flexibility for influencing selectivity associated with herbicidal properties.

Subsurface application of herbicides as soil-incorporated pre-planting treatments or application at planting will have a profound effect on use of herbicides. A knowledge of the fundamental chemical and physical properties of new herbicides, especially vapor activity, will aid in determining need for the subsurface application of such chemicals.

Outstanding progress is being made in the rapid development of chemical weed control methods in crops other than cotton and for specialized noncrop land areas.

A Total Farm Problem

It must be recognized that we are entering a new era which involves utilization of various forms of energy, not only to control weeds but also to control insects and diseases and for crop protection and crop production in a variety of ways. Increasing emphasis on basic research and education will be required if we are to utilize the chemical enegry of herbicides most effectively in the future.

There is increasing evidence that mechanical equipment will be used more and more in the future to transport chemical energy. Herbicides will be the sources of energy and they, rather than the machine with which they are applied, will perform the work. This does not imply that the need for mechanical equipment will be reduced. Quite the contrary. It means greater emphasis on specificity and accuracy in placing the chemical energy in the exact amount, in the exact place, and at the exact time to perform its maximum work.

We must keep in mind that weeds are a total farm liability and all crops are subject to their competition. We must give greater consideration to weed control problems as a farm unit rather than limit research techniques to the control of weeds in a single crop. Cost of controlling weeds in a single crop undoubtedly appears high because only that crop is being considered.

To obtain a better balanced and more efficient weed control program in crop production, farmers must be encouraged not only to use chemical weed control methods for controlling weeds in the current crop, but to place greater emphasis on supplementing this program by rotational use of herbicides on all tolerant crops throughout the rotation.

We also need to expand our studies on the possible rotation of different herbicides on the same crop grown continuously. Herbicides possess differential selectivity and specificity, and rotating them will aid in preventing undesirable

Ginners in Valley For Meeting

Directors of Texas Cotton Ginners Association and allied industry representatives are holding their annual meeting Jan. 22-24 at the Echo Hotel, Edinburg, in the Lower Rio Grande Valley.

The Press, official publication for the Association, will publish a report on the meeting in the next issue.

ecological shifts in weed populations and reduce the chance of an accumulation of herbicide residue in the soil.

We also need to learn more about the efficiency of rotating different herbicides on different crops throughout the rotation. This practice will permit continuity in use of chemical energy to control weeds, and reduce weed seed populations in the soil.

Extent, Cost, and Value

Farmers have demonstrated outstanding interest in the use of chemicals to control weeds. Herbicides are being applied on more than one of every 10 acres of cultivated land. It is estimated that over 150 million pounds of herbicides are being used annually on over 75 million acres of crop lands and industrial sites at a cost of about $300 million.

About 70 percent of the acreage being sprayed for weed control is being treated by farmers with their own equipment.

A recent survey showed that about 50 million acres of agricultural land was treated for weed control in 1959, more than double that of 1949.

No one would attempt to predict what new discoveries might develop in weed control from intensive fundamental research involving chemistry, plant physiology, genetics, crops and soil science, and agricultural engineering. We can be certain, however, that unless fundamental and applied studies are brought into better balance and expanded, applied studies in development of weed control practices in crop production will suffer. Use of herbicides in some instances is beginning to exceed the fundamental and applied research information available to insure their safe use. If a better balance between research in weed control and use of chemicals is not obtained and maintained in the immediate future, risk of crop damage will increase.

I am not convinced that our weed control progress will be characterized by the discovery, development, and utilization of more efficient forms of energy in the future. The adaptability of chemical energy for controlling weeds offers almost unlimited possibilities for improving the efficiency of weed control. Thus it seems that our future rate of progress will be largely determined by (a) the discovery of more selective, more specific, better translocated, more efficient, better formulated, safer, and more economical herbicides; (b) a basic fundamental understanding of effects of chemicals on plant growth and soils; (c) our ingenuity in supplementing and combining chemical and cultural practices; (d) a fundamental understanding of the limitations of our current weed control practices; and (e) the development of new and more effective weed control techniques and the discovery of more effective and more efficient sources of energy for selective weed control.

The development of improved chemical, cultural, biological, mechanical, and combination weed control practices represents one of the most effective approaches to increased efficiency, and lower cost, mechanized, crop production.

Progress and Trends in Weed Control Methods

■ **Dr. Robert P. Upchurch,** Associate Professor, Department of Field Crops, North Carolina State College, Raleigh.

There has been a tremendous urgency to do many things to improve the position of cotton in our economy. Increased mechanization has been one of the bright hopes. Often weed control has been cited as the single most limiting factor in mechanization. Each year scientists have whetted the appetites of the cotton producer by reporting the great strides being made in weed control research. We should not look at what has resulted from this talk and hope for improved weed control practices. Are such practices gaining acceptance by farmers in the various regions of the Belt and has

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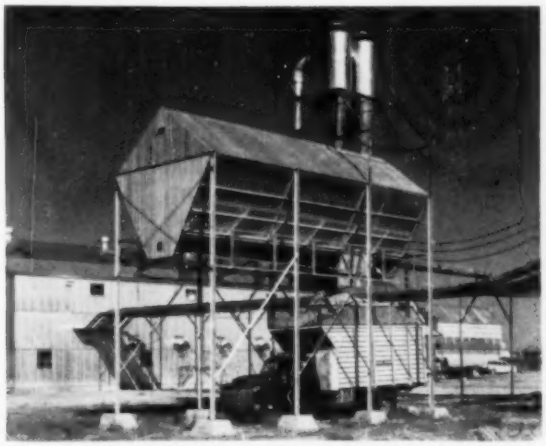

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there been a wedding of new weed control practices and the mechanical harvester?

To determine trends in weed control practices, I have called on some help from professional associates in a number of the important cotton producing states.

A Gradual Trend

In 1956, less than 10 percent of the cotton acreage in Arkansas, Mississippi, Louisiana, and Tennessee was treated with pre-emergence herbicides. The gradual trend led to a large portion of the cotton in these states being treated in 1960. Following these trends, it is reasonable to predict that about 75 percent of the cotton in these states will be receiving pre-emergence treatments by 1963 or 1964. This is truly a remarkable sign of a revolution in cotton production.

Full benefit of labor saving pre-emergence treatments cannot be realized unless mechanical harvesting also is adopted. Data show that the trend cited for the Delta states for pre-emergence herbicide usage have been accompanied by similar trends in mechanical harvesting. Based on these trends, it seems reasonable to predict that by 1963 or 1964 Delta states also will be mechanically harvesting about 75 percent of their cotton acreage.

Complete mechanization of cotton depends on reducing labor for early season weed control, reducing labor for harvesting and controlling mid-season weeds to permit effective production and harvesting. Mid-season control can frequently be managed by sweep cultivation, but farmers who desire a complete mechanization program want a more effective technique for mid-season and late weed control.

Delta Leads

Delta state farmers have been in the forefront of those seeking more effective mid-season control techniques. They have extensively used cross cultivators, lateral oiling, flame cultivation and lay-by herbicides. All treatments are effective to a degree but the farmer is seeking a better solution. Reports indicate that Delta farmers are going to be giving diuron a thorough try as a lay-by treatment. It is too early to detect a significant trend toward permanent adoption of this practice.

A major change has and is occurring in production of cotton in the Delta states. Pre-emergence herbicide usage and mechanical harvesting have arrived. Farmers are ready for a new development in mid-season such as lay-by weed control treatments and are trying such treatments as are available on a wide scale.

Arizona, New Mexico and California are already mechanically harvesting 75 to 80 percent of their cotton but they use very few pre-emergence herbicides. Reports are not that pre-emergence herbicides are not needed but rather that they generally do not perform efficiently under irrigated conditions. Lay-by treatments are, however, very effective under these conditions and far western states are moving about as fast in adoption of lay-by treatments as Delta states are in adoption of pre-emergence treatments.

A rather significant portion of the Texas and Oklahoma acreage is mechanically harvested and yet neither pre-emergence nor lay-by treatments have been widely accepted. Much of the cotton in Oklahoma has shifted to the western arid part of the state where weeds are apparently not critical. In Texas, pre-emergence treatments are apparently not very effective. Rotary hoe and lateral oiling are common weed control practices in Texas.

Following the Trend

Alabama, Georgia, South Carolina and North Carolina seem to be following the same basic trends as the Delta States, except the pattern is about four years behind. Estimates for pre-emergence herbicide usage and mechanical harvesting indicate the beginning of major trends. If these trends continue, about 50 percent of the cotton acreage will be treated with pre-emergence herbicides and mechanically harvested within a very few years. Reports show that in each of the four Southeastern states, a few hundred to a few thousand acres were treated with lay-by herbicides in 1960 and that an appreciable increase can be expected in 1961. Flame cultivation and lateral oiling are not used in the Southeast.

In addition, farmers throughout the Belt are using dalapon as a spot treatment for Johnsongrass control.

I have not attempted to point out limitations of varoius weed control treatments. However, it is obvious from the survey that treatments which are successful on a state-wide or belt-wide basis have some serious limitations in a given year or on a given field. Some of these problems undobutedly will be corrected by research now underway.

Effort which private and public research, educational and development organizations have expended on developing techniques for reducing the labor requirement for cotton production have been effectively expended. Major changes in weed control and harvesting techniques have and are continuing to occur in several major cotton producing areas. Farmers are anxious for additional weed control treatments to solve problems not solved by present treatments.

Cotton Insect Control in The Boll Weevil Area

■ **Dr. Walter J. Mistric, Jr., Entomologist, North Carolina Experiment Station, Raleigh.**

The economic battle cry for cotton in the 1960's has been sounded. We must consistently produce high yields of one and one-half to two bales per acre. Research workers and leading growers have proved this a realistic goal. Entomology can meet the challenge of insuring these high yields in the years ahead. Technical knowledge is available. We are limited only by interpretation, organization, and presentation of this knowledge.

To adopt an effective and practical policy, we must: (1) clearly define the general insect problem in a specific area; (2) recognize the area's physical, climatic, sociological, and psychological resources; and (3) determine what growers can and will do.

A Few Practical Facts

We haven't been doing these things in the past. Here is a classical example of what we have been doing. A state publication stated "there are a few practical facts about the weevil that every man who attempts to grow cotton under boll weevil conditions ought to know. Everything equal, cotton grown in infested areas should have a medium sized boll. Small boll might be best, if not for other disadvantages that offset the weevil advantage of the small boll. Theoretically, if 50 bolls made one pound of large boll cotton and 100 bolls made one pound of small boll cotton and the boll weevil punctured 25 squares of each, we would have one-half pound of one variety left and three-fourths pound of the other. The publication also stated "a good garden for every tenant, with instructions for cultivation from the land owner, would be extremely beneficial in the fight against the boll weevil."

After sour experiences with calcium arsenate in the 1940's, we ran into a period of mass confusion and shaken confidence when we attempted to engage the boll weevil in defensive warfare with a great arsenal of modern chemicals and equipment. This era emphasized control on an individual field basis. It involved the most complex scientific knowledge. It dealt with variables rather than trends. If control was to be effective, every grower had to be highly trained. We had to assume that every grower was in constant readiness with equipment and insecticides.

Since we approached the brink of the infestation cliff, we had to hope for favorable weather. We had to assume that every grower, no matter how diversified, had the pursuit of the researcher. We had to assume that each grower had the pursuit of the researcher, and that he would keep up the fight during the darkest hours of heavy insect infestation. We further assumed that each grower had an analytical mind capable of evaluating the outcome. We accepted the short term gain with its accompanying risks. We inferred that most anything could happen anytime in a given field in a given year. We attempted to soothe this by making statewide and beltwide predictions on weevil abundance in our forests. Our communication with growers failed. In North Carolina this program was not successful, and under no known condition did it produce near maximum potential yield.

A New Era

Into the late 1950's we witnessed the beginning of a new era. Practically every state recommendation called for the initiation of weevil control measures at an earlier date or a lower level. Research became more basic and more practical.

Of immediate concern was future paths in education. Four control methods were considered: (1) a more intensive effort toward making each grower an amateur entomologist; (2) use of commercial scouts or professional consultants; (3) continual use of insecticides from seedling to open boll; and (4) an effectively planned insect control program.

If we follow the technical education approach in North Carolina, two extension entomologists, part-time on cotton, must reach 82,909 cotton growers in 78 counties. Considering past progress with this method, the future would not be bright without a massive increase in personnel. In our principal cotton county the annual fee per acre for commercial scouts would be about $40. This would about equal the cost of using insecticides from seedling to open boll. Either of these would be difficult under present conditions. Consequently, our attention turned to the possibility of simple, effective, and economical control.

By 1959, we had defined the insect problem and offered a planned control program as a solution. This program

was put to a test throughout North Carolina in 1960 in small experimental plots, in large experimental blocks, and in experimental useage by growers with acreage ranging from a few acres to several hundred acres. Results were consistently outstanding. We have found a way to produce more cotton at lower cost and with less risk.

In early November, North Carolina State College adopted this program as the general statewide recommendation for 1961. Clemson College may adopt a similar program for South Carolina. Georgia has shown an interest in this type of program. Texas has been interested in this approach for many years, but several factors, which do not prevail in the Southeast, complicate the effort in Texas.

Standard, Simplified Plan

This program is to be considered standard cotton production practice. We have attempted to standardize and simplify control suggestions to the greatest degree possible. The schedule is planned so that a grower needs to know, aside from procurement of equipment and chemicals, how to count to eight, read a calendar, and recognize a bollworm hole in a square. Only 10 insecticides or mixtures are listed. Each can be used throughout the season at a moderate dosage for control of boll weevil, bollworm, and aphids. All applications will be broadcast with boom-type machines. Sprays are to be applied at the rate of six gallons per acre and dusts at the rate of 15 pounds per acre throughout the season. This program does not include control of pests on seedling cotton, for we have found little economic gain in controlling these pests under existing conditions. Cultural control of spider mites, which can be easily obtained, is stressed. However, when necessary, miticides should be included in the early-or-late-season phases of the control program.

Briefly, the schedule is as follows:

■ EARLY SEASON—At the eight-leaf stage, begin four applications at five-day intervals.

■ MID-SEASON — During this period of about four weeks when regular applications are not scheduled, make one application whenever five percent of the squares have been injured by small bollworms.

■ LATE-SEASON — On July 24, resume applications at five-day intervals until plants stop squaring.

Evidence indicates that adoption of this program in North Carolina would easily double statewide yield. This program also reduces the control burden by 50 percent on our most conscientious growers of the past. However, boll weevil migration will remain the limiting entomological factor in cotton production until we achieve much greater grower participation in early-season control. Most future research will be directed toward obtaining a higher degree of control of overwintered weevils. This appears the most economical and practical method of solving weevil buildup and migration.

I feel that entomology can meet the challenge of the 1960's and consistently insure the production of high cotton yields at lower costs. To achieve this in North Carolina, we must be totally and permanently prepared to take the offensive in preventive warfare on a broad front. We know from hard facts that in this fight an ounce of prevention is worth nearly a ton of cure.

Oxygen and Physical Impedance Affecting Germination

■ **Dr. Henry D. Bowen, Agricultural Engineer, North Carolina State College, Raleigh.**

Physical impedance and aeration are but two of a multitude of environmental factors affecting seed germination and emergence. Some are requirements. Some are limitations. Plant physiologists discuss requirements and list a suitable temperature, adequate moisture, and adequate oxygen as necessary for germination of all seeds including cotton. There are many limiting environmental factors such as physical impedance, toxicity of various types, insect populations, disease organisms, soil PH, etc. However, the one factor that is always limiting in some degree under natural soil conditions is physical impedance.

To obtain control of seed environment, we must have a working knowledge of the three requirements—temperature, moisture and oxygen—and of the limiting factor, physical impedance. For ultimate control we must have a knowledge of all important factors, requirements and limitations, and develop methods for optimizing their influence.

Physical Impedance

Physical impedance is the mechanical resistance a seed or seedling must overcome in swelling, emerging, and root penetration. This is a limiting factor of which we know very little. We think the optimum physical impedance from the physiological standpoint of seed germination and growth is zero pressure. However, for developing forces sufficient to emerge, some physical impedance is necessary. But we do not know how much and where it should be most effectively placed.

When physical impedance, as measured by hydraulic pressure on a very small balloon placed at seed depth, exceeds 15 psi net pressure, emergence percent is reduced. And when pressures reach 25 emerging. Emergence is delayed several days and will be reduced to about 30 percent. Preliminary tests using a pressure cell indicated that cottonseed will not germinate if they must swell against pressures of greater than 12-15 psi under normal oxygen partial pressures.

Literature indicates there are important interactions between aeration and the physical impedance a root can overcome. The pressure cell tests are designed to determine both the main and interaction effects of physical impedance, temperature, moisture, and oxygen and carbon dioxide (CO_2) levels on the ability of a seed to swell and germinate.

Physical impedance has been investigated for a Norfolk loamy sand. In general, the more moisture in soil and the greater the surface compaction at planting, the greater physical impedance. Air dry soil never has any appreciable physical impedance regardless of surface compaction. Soil with field capacity moisture will ordinarily reach 25-40 psi in the first three days after planting if it has had three psi surface compaction. Physical impedance becomes limiting when this soil is given a surface compaction of greater than one psi if the soil has near field capacity moisture. This soil has been known to change from four psi at 9 a.m. to 60 psi at 6 p.m. of the same day when wetted in the morning of a hot, windy day. Maximum physical impedance developed by this soil is many times what the seedling can overcome.

Soil Aeration

Soil aeration includes oxygen availability and maintenance of a suitably low CO_2 level. If enough oxygen is available the CO_2 level ordinarily will remain sufficiently low. To my knowledge, this has not been clearly demonstrated to be true for cotton.

Almost no quantitative data extending across varieties are available regarding many respiration questions of cotton. We are getting some of these answers.

■ GROWTH PROCESSES in general, require oxygen.

■ BREAKING DOWN complex substances to simpler substances with release of energy in plants and animals is called respiration.

■ RESPIRATION IS CONTINUOUS in a seed, even in dormancy, but is greatly accelerated by an increase of water content above 13-17 percent.

■ THERE ARE TWO DISTINCT respiration processes. First, the normal or "aerobic" respiration that occurs in the presence of an adequate supply of molecular oxygen. Second, the respiration in tissues when molecular oxygen is limited. This is called anaerobic respiration.

■ GROWTH PROCESSES slow down or cease under strictly anaerobic conditions, except possibly for a few species such as cypress and rice.

■ RESPIRATION CONTINUES under anaerobic conditions faster or slower or at the same as aerobic rate depending on circumstances. Necessary oxygen is gotten by breaking down food substrate, which results in toxic substances, such as ethel alcohol and acetaldehyde, being formed.

■ RESPIRATION RATE INCREASES exponentially with temperature within the normal germination temperature range.

■ FOOD SUPPLY for the embryo is limited.

■ FOOD SUPPLY for the embryo may be sugars, starches, or fats. Some are more readily utilized than others. Anerobic respiration eventually leads to depletion of food reserves in cotyledons and production of toxic products. If prolonged sufficiently, this leads to death.

Most seeds will not grow if submerged in water or in soil that is saturated. Tests show this is true even though air in the water might have five times as much oxygen as air saturated water. Oxygen enters the seed by diffusion. The partial pressure on the seed coat in a constantly stirred water solution is as great as in air, but the diffusion constant

of oxygen in water is only 10-4 times that of air. Thus a water film approximately .4 mm thick would reduce the rate of oxygen flow into the cottonseed to incipient anaerobiosis. This thickness assumes that all of the seed coat is available for oxygen diffusion. Actually, not all of the total area is available. Since seed coat thickness is approximately .4 mm, a water saturated seed coat would prevent aerobic respiration even if the seed were in air. The effect will be the same if intercelluar spaces are water saturated to a depth of approximately .5 mm.

Studies have shown that cottonseed do not grow when submerged in water constantly. They will grow when removed from the water and cease to grow when submerged again. This may be repeated for several cycles without apparent harm to seed. However, growth must be calculated for the time they are out of water.

Conclusions are that cottonseed can germinate and emerge under part-time saturated conditions, if the time under aerobic conditions is enough to provide growth required for emergence.

It is generally agreed that soil is saturated only during rains and for a few hours after rain and that water soon drains until pores open and aerobic respiration is restored.

Studies have shown that when soil pores are large, soil never becomes saturated unless the water table rises to the surface, except for a very thin layer (less than one inch) at the surface. However, when pores are small, soil can become saturated and will not drain for many days. These soils remain saturated until they are evaporated open.

Norfolk loamy sands and finer soils have pores so small they will not drain if seed are planted in air dry soil and then wetted from the surface. These soils will not be opened to oxygen diffusion sufficient for seed germination until the pores evaporate open. It is obvious that in cold, damp, cloudy weather the pores may not open for several days or weeks. This is damaging to seed, especially if temperatures are high enough to cause appreciable anaerobic respiration and disease activity.

In other cases we can have frequent showers, warm weather, high humidity. These soils cannot open long enough for emergence, either. However, if it rains and hot sun prevails for two or three days with enough wind to dry the soil, capillaries will evaporate open. Aerobic respiration can then begin and, provided the rains are not too close together, even this soil with small capillaries can germinate.

Contrast this same Norfolk soil planted when soil moisture was near field capacity. Even with surface compaction, this soil has large pores almost impossible to saturate and will quickly drain open even if it becomes saturated. Unless the water table of this field remains at seed level, these seed will remain under anaerobic conditions only a short time, probably only while an actual water film is continuous over the seed during the rain itself.

We have achieved a measure of control simply by understanding the extreme effects that can result from planting in dry, sandy soil and waiting for a rain. What we do about this, remains to be seen. What is done at planting is extremely important in terms of the future environmental effects on seed and emerging seedling.

We have just scratched the capabilities available in seed and plant environment control. We will not develop fully what we need in this control without first systematically determining what a cotton seed and plant requires and then examining our resources and applying our physical and physiological principles to see what we can provide.

Whether or not we make the tremendous strides necessary in environment control in the 1960's is dependent on how much horsepower we want to put behind the effort.

Fusarium - Nematode Control

Dr. A. L. Smith, Plant Pathologist, ARS-USDA, Alabama Experiment Station, Auburn.

Average annual losses from both wilt and nematodes amount to approximately 325,000 bales. At $150 per bale, this would be $48,750,000.

Wilt losses have shown a gradual decline in the four southeastern states. Widespread use of resistant varieties has reduced losses to an estimated 1.75, 0.88, 2.25 and 1.0 percent, respectively, in North Carolina and South Carolina, Georgia, and Alabama, according to estimates for 1959, a higher than average wilt year. This is an average of 1.47 percent.

In Mississippi Valley states where wilt-resistant varieties have not been so widely used, losses run higher. Loss estimate for Mississippi was 2.3 percent, Louisiana, 2.5 percent, and Missouri, 4.00 percent, for an average of 2.93, or exactly twice that of the four southeastern states. These losses will no doubt be reduced with further development of resistant varieties adapted to the Mississippi Valley area. This trend is already under way with the release of Rex in Arkansas, Dixie King in Mississippi, and large-scale adoption of Auburn 56 in Missouri.

The Plains area of Texas and Oklahoma shows increases in both wilt and nematode losses. Resistant varieties of the storm-proof types are not available. Resistant varieties also are unavailable in the Acala areas of New Mexico, Arizona and California where nematode, but not wilt, inflicts losses on all lighter soils.

New Developments

There are three control possibilities—development of resistant varieties, application of soil fumigants, and rotations.

Newer wilt-resistant varieties being accepted by farmers include All-in-One, Auburn 56, Austin, Coker 100 A, Coker 124, Dixie King, and Rex. Greater emphasis is being placed on breeding for resistance to one or both of these diseases in most breeding projects throughout the Belt.

Some new developments in use of soil fumigants can be reported. Acreage being treated, while small, is gradually increasing. Nemagon now can be applied in irrigation water, with the fertilizer as granules, or attached to seed in pelleted form.

Rotations to reduce nematode populations are gradually being adopted, but little information is available on the extent to which this practice is used.

Real progress is being made with these three possibilities.

Fusarium Wilt Pathogen

Fusarium wilt is caused by a fungus which enters the fine roots of cotton following injury by nematodes. It moves up the water conducting vessels which become plugged, causing wilting and death of the plant.The wilt fungus is distributed on seed and appears to be spreading into West Texas wherever nematodes become a problem. Wilt has not been reported in New Mexico, Arizona and California.

It is this dependence on the nematodes for entrance which led to the designation of fusarium wilt-nematode complex. It later was found that nematodes made the wilt worse by feeding on roots throughout the summer. The loss from wilt was about in proportion to the number of nematodes feeding. In some cases nematodes are so abundant that even wilt-resistant varieties die out from the combined effect of the fungus and the nematodes. Wilt-resistance is made up of one gene for resistance to fusarium combined with several genes for resistance to nematodes. Breeding for resistance to fusarium is fairly simple, but breeding for resistance to root-knot is more time consuming.

Nematodes

Three nematodes are important in the wilt relationship. Root-knot nematode is by far the most important species attacking cotton It is estimated that for the cotton belt as a whole, root-knot causes 85 to 95 percent of the nematode damage.

The sting nematode is, in some respects, a more damaging parasite. It is fortunately limited to the more sandy soils and is particularly prevalent in the lower coastal plains of the southeastern states.

The reniform or kidney-shaped nematode is perhaps more severe in its attack than either the root-knot or sting. Known distribution is limited to about a dozen isolated spots.

Perhaps a dozen additional species parasitic on cotton may be found in association with the above species. However, some of these have been isolated and, acting alone, do not seriously affect yields. Acting together several species may become quite important and no doubt take an annual toll not recognized or adequately measured.

Planting Resistant Varieties

Data show 3,106,000 acres harvested from resistant varieties in 1960 and 10 wilt states from North Carolina to Texas. This compares with 825,900 acres in 1950. In North Carolina, South Carolina and Georgia, 95 to 99 percent of the acreage is planted to resistant varieties. Largest increases in planting of wilt resistant varieties have been in Georgia, Alabama, Arkansas, and Missouri.

Yield of Auburn 56, the most resistant variety available, can be increased 15 to 20 percent with soil fumigants. Yield of Clevewilt-Stoneville family of wilt-resistant varieties, which include Coker 100A, Plains, Rex, Empire, and Dixie King may be improved 25 to 40 percent through nematode control on heavily infested soils. Thus, there is still excellent opportunity for improving by enhancing nematode resistance.

Through a cooperative arrangement between the Cotton Section of the Agricultural Research Service and the Alabama Agricultural Experiment Station in Auburn, a regional wilt-nematode

screening program has been conducted for the past several years. Facilities of this program are available to all breeders. Breeding lines are brought together from across the Belt and tested under field conditions on a heavily infested soil at the Plant Breeding Unit at Tallassee, Ala. This testing program has proven valuable in determining which commercial lines are most resistant.

Through cooperation with the Regional S-1 genetics group, new sources of root-knot nematode resistance have been found in wild cottons. Some of the material has wilt resistance superior to that of any commercial varieties. A breeding program is underway at the Alabama Station to transfer this resistance to a commercial type. This high resistance is also being used in the Pima breeding program in Arizona.

Soil fumigants are providing effective control where resistant varieties are not available. These materials control both wilt and nematodes and give remarkably increased yields where soils are heavily infested. Two to three gallons of Dowfume per acre, seven to ten gallons of DD per acre, and three to four quarts of Nemagon per acre, row application, have proven effective at the Plant Breeding Unit in Alabama and in other states. These materials have not been widely adopted in the rainbelt because of cost. In some western states where greater increase in yields are possible, use of soil fumigants is more economically feasible and is increasing.

How To Minimize Loss

Cotton growers can minimize losses from wilt and nematodes by:

■ PLANTING WILT-RESISTANT varieties on soils known to be wilt infested. Resistant varieties in about the descending order of resistance are: All-in-One, Auburn 56, Plains, Coker 100A, Dixie King, Rex, Empire, and Austin. For soils very heavily infested, Auburn 56 and All-in-One are preferable. They have sufficient resistance to withstand the most severe wilt and nematode situations, with minor exceptions, and yield more than other commercial varieties on heavily infested soils.

■ SOIL FUMIGANTS may be profitably used to control wilt and/or nematodes on severely infested soils where wilt-resistant varieties are not available.

■ ROTATIONS with corn, sorghum, small grains, and other crops. Observations indicate that cotton following two years of other crops may yield as well as on a fumigated soil.Rotations are not commonly practiced, but with acreage allotments, more growers now have opportunities to utilize this system of control.

Mechanical Picking Guides

■ **J. K. Jones, Agricultural Engineer, National Cotton Council, Memphis.**

Guides for successful mechanical harvesting invariably revolve around two basic factors—quality preservation and picking efficiency. If a producer does a good job on these, he has done a good job of mechanical picking.

These are separate, distinct categories in many ways; when it comes to specific recommendations and particular rules to follow, they are often connected. That is, a malpractice that will decrease picking efficiency often creates a quality hazard and vice verse. Or, when something is done to increase picking efficiency, quality is often enhanced.

We've seen definite improvement in cotton pickers the last 10 years in durability, efficiency and quality preservation capabilities. I'm sure we'll see even more in the future.

Planning Comes First

However, cotton pickers, like other machines, have limitations and a great deal of their success depends upon condition of the crop. Field and plants must be suited—I suppose you could say "tailor made"—for machine harvesting. Deciding to use a machine at the last minute with no advance planning and preparation stacks up pretty high odds against profits and quality.

Getting such a field is no accident. It requires a great deal of advance planning and preparation.

Planning must start with land selection and preparation. Field lay-out, drainage, tillage and row shape are some of the more vital points. This is the foundation for making the crop.

Proper planting is an important key to obtaining an optimum stand of two and one-half to four plants per foot of drill. Picking efficiency can suffer a decrease of five to seven percent due to poor plant population, in addition to losses in yield, inefficient use of chemicals, and increased difficulty with weeds and grass.

Some fertilizer is good—even essential. But too much can be bad for mechanical harvesting as well as being unprofitable. Over-fertilization can cause excessive vegetative growth, which leads to problems in defoliation and actual machine operation. A balanced fertilizer program should be practiced for maximum yield, efficiency, and best machine harvesting.

Insects and diseases are notable enemies of mechanical harvesting as well as yield. They can delay growth and fruiting, resulting in non-uniformity and late maturity.

Grass and weeds pose a real problem for mechanical pickers. Removing grass from cotton at the gin often involves use of equipment and processing that can cause fiber damage. If it isn't removed, the bale can be classed "grassy" and downgraded as much as a full grade. One objective should prevail—100 percent control.

Successful defoliation is a big aid to quality preservation and picking efficiency. It exposes bolls to sunlight and air movement, which accelerates opening, retards fiber and seed deterioration and reduces boll rot. Dew also is dried faster, providing more safe picking time.

Naturally, we can't control year to year variation in climatic conditions. But the producer who follows good practices will not be hurt by adverse weather as much as one who has not followed these practices. We can't control the weather, but using good production techniques will better enable us to adjust to it.

The picker itself looks big and complicated, but when broken down it's like other harvesting machines except for the picking unit. Three parts are used in removing seed cotton from the burr—the spindle, a pad to keep the spindle clean, and a stripper or doffer to remove cotton from the spindle. Recommended adjustment is the same for all field conditions.

Two other parts guide open bolls into contact with the spindle. These adjustments—stalk lifters and pressure, or crowder plate—do change with field conditions.

Prior to each harvest season the machine should be checked to make sure all functions are in line with manufacturing recommendations. Then set up a daily schedule for servicing. This is outlined in operator manuals. Several state extension services have key check points listed on a sheet that is handy and easy to use.

Operator Is Big Factor

The operator is a mighty important figure in mechanical harvesting.

First, he must be responsible for daily servicing. He must know enough about the machine to make adjustments when necessary.

Secondly, he must operate the machine properly. Important points are keeping the machine at the proper speed, centered on the row and not raising and lowering the picking unit in the row. This causes a stripping action, which results in lower picking efficiency and increased trash content, particularly bark. Many grassy classification are actually caused by bark instead of grass.

Third, he must know field maintenance. This means keeping the unit and basket free of trash and making periodical adjustment checks.

Trash and Moisture

The actual harvesting operation is where we encounter the crux of mechanical harvesting problems—trash and moisture.

When considering adverse effects of trash and moisture, we have to look beyond harvesting. We have to look to the gin where their removal encourages processing that can lead to fiber damage. We have to look even further to the mill where this fiber damage can lead to trouble.

To me it seems only logical to assume that the best solution to this problem is to avoid bringing damp, trashy seed cotton to the gin. If producers bring uniformly clean, dry cotton, there is obviously no need to employ elaborate ginning treatments that can cause quality damage.

The biggest single cause of excessive moisture is picking too early in the morning, too late at night, or too soon after a rain while cotton is damp. Tests have shown that moisture of seed cotton on the stalk should be 10 percent or less before machines are used.

Research has established that relative humidity is the greatest single factor affecting moisture in seed cotton, excluding actual rainfall. Though we have no control over humidity we do have counter measures to offset it.

Defoliation is one way. This allows sunlight and air to better penetrate the plant, thus increasing the rate of dew evaporation. A defoliated field also provides less leaf surface on which dew can form. As a result, the safe picking level is reached about one to one and a half hours earlier.

This is an especially perplexing problem because when a producer has cotton open it's hard to convince him that he should stay out of the field. In many areas, particularly in the rain belt, moisture content of seed cotton doesn't reach this level until about 8 or 9 a.m. It usually reaches 10 percent again at about 4 or 5 p.m. To do a quality job of mechanical harvesting, it is imperative

(Continued on Page 42)

• Recommend More Research Funds

INCREASED FUNDS for activities of the Cotton Research Committee of Texas will be recommended to the Texas Legislature to be appropriated for 1961-62 and 1962-63.

Following hearings, the Legislative Budget Board recommended an appropriation of approximately $204,000 yearly. Board Chairman is Lieutenant Governor Ben Ramsey.

Texas Commission on Higher Education held a special hearing on the budget and recommended $206,000 for 1961-62 and $210,000 for 1962-63. A. M. Muldrow is chairman.

Carl Cox, Dallas, director of the Cotton Research Committee of Texas, expressed appreciation for the strong industry support which is being given to the program.

"Many members of the industry," Cox commented, "serve on our advisory committee or give us the benefit of their practical experience in developing and guiding research projects.

"In addition, at hearings this summer, Dr. Earl Berkley, then with Anderson, Clayton Fiber Laboratory; Jack Whetstone, Texas Cottonseed Crushers Association; George W. Pfeiffenberger, Plains Cotton Growers; and Glen Witts, Motion Control, Inc.; effectively testified as to the value of Cotton Research Committee work and the need for adequate funds."

Cox added that approximately $70,000 in private funds will finance specific research projects in addition to these proposed appropriations by the State of Texas from its general fund.

• Continental Has Sales Meeting

CONTINENTAL GIN CO. held a sales meeting for approximately 100 members of the sales, administrative and engineering staff on Jan. 6-7 in Dallas.

The meeting heard plans for 1961 and a review of the past year, a record sales year for Continental.

A. L. Vandergriff, Continental president, said plans were being made for an even greater year in 1961.

Continental personnel also saw a preview of the high capacity brush gin and matching feeder, which will provide increased daily capacity of lint cotton to match the accelerated picking capacity of multiple row picking machines and mechanical strippers, Vandergriff said.

Also previewed at the Continental meeting was the Smooth Flow Tramper Feed, with a capacity of 20 bales per hour.

"We are very proud of these two machines and we know they will receive enthusiastic support from the cotton growing area," said Vandergriff.

• **Moving Warehouse**—On Jan. 16, it was announced that Continental is moving its Southeastern warehouse and parts depot, now in Atlanta, to Augusta, Ga. Property has been purchased for a new building seven miles west of Augusta on Highway 78, which will house a warehouse and parts depot occupying approximately 15,000 square feet, in addition to office space.

Continental officials said the new operation will be staffed with experienced personnel, qualified to render prompt and satisfactory service on Continental equipment.

"Augusta has many natural advantages as a distribution center for the Southeast," Vandergriff said. "Easily accessible to our customers, it will enable us to speed up delivery of equipment and parts as well as render fast service."

The new facility will be under the direction of E. T. Walrond, district sales manager, whose office is in Birmingham.

Continental Gin Co. is a division of Fulton Industries, Atlanta.

Oklahoma Ginners Slate District Meetings

Annual district meetings for Oklahoma Cotton Ginners Association will be held in late January and early February.

Meeting dates are:

Districts 1 and 5—Jan. 25, 6:30 p.m., Town House Cafe, Elk City. Bill Shannon in charge.

Districts 2, 3, 4, 6, 7, 8, 9, and 11—Jan. 26, 6:30 p.m., Quartz Mountain Lodge. Bob Davis and Loyn Marvel in charge.

District 12—Feb. 3, 11:30 a.m., Severs Hotel, Muskogee. G. N. Irish in charge.

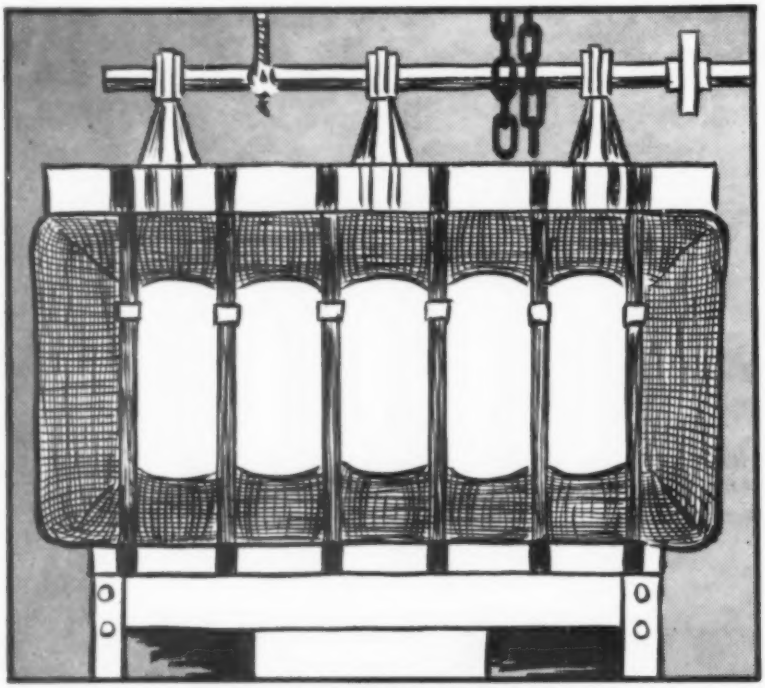
Districts 10 and 13—Feb. 3, 7:00 p.m., Texoma Lodge. Kay Bass in charge.

District directors will be nominated at each meeting.

Bischoff Heads Exchange

Ludwig Bischoff, Hohenberg Brothers, was elevated to the presidency of Fresno Cotton Exchange at the annual meeting on Jan. 17.

W. L. Munday, Jr., retiring president, becomes chairman of the board.



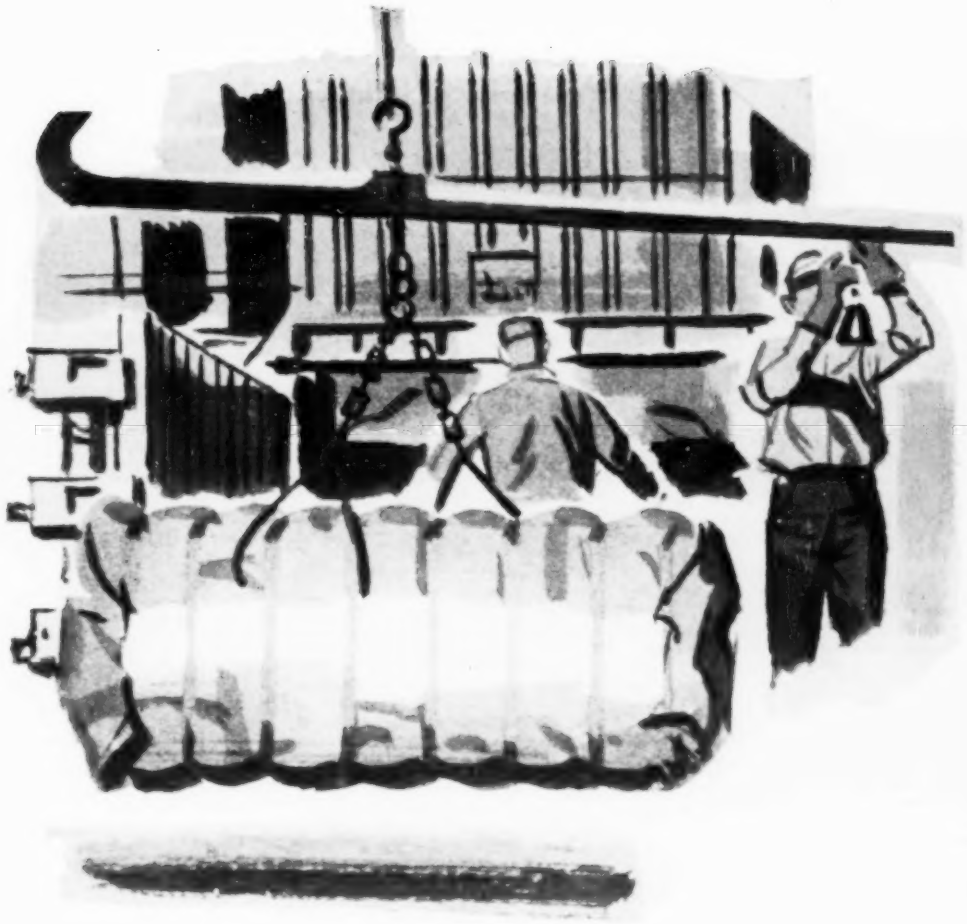
THE TIES THAT BIND

COTTON PRODUCERS and GINNERS TOGETHER

The Plains Cotton Growers are deeply aware of the close ties between producers and ginners and other segments of the entire cotton industry. That is why the PCG has invested more than $100,000 in various research projects — including ginning — to strengthen these ties, and improve the position of cotton in the PRESS of competition.

Plains PCG COTTON GROWERS, INC.

1720 AVE. M LUBBOCK, TEXAS



RESPONSIBILITY — Today more than ever it is imperative that ginners preserve the quality of the lint that growers entrust to their care.

ANDERSON, CLAYTON & CO.

(Incorporated)

HOUSTON · MEMPHIS · LOS ANGELES
NEW YORK · BOSTON

Beltwide Conference

(Continued from Page 39)

that picking not begin until the safe moisture level has been reached.

Time will vary, depending on leaf cover, dew, temperature, amount of sunlight, and other factors.

Naturally, it is impractical to suggest that every producer buy a moisture meter to make this determination. However, efforts are now being directed toward developing a guide that will enable a producer to observe existing conditions, relate them to the guide, and determine when he can begin picking.

Tests have shown that the amount of moisture added by spindles is only about one to two percent if the right amount of water is used. Since spindle moisture is absorbed almost entirely by lint, this actually represents an increase in lint moisture of about three to six percent.

Conditioning Oils

There has been a trend to the use of textile conditioning oils to reduce field house-cleaning. While these oils will help keep the inside of the unit clean, a three-year study in California and Mississippi showed that they can reduce picking efficiency one to three percent. And the moisture content of the seed cotton was not improved. There also is the cost of the oils in addition to the effect they have on moistening and doffer parts not 100 percent resistant to them.

The last source of moisture I would like to consider might be called "hidden moisture." This is moisture in trash harvested with cotton. Some trash, especially green leaf, has a much higher moisture content than lint. When they are mixed, amount of moisture in the cotton is naturally increased.

This problem becomes critical in handling and storing as well as ginning. Damp, trashy cotton undergoes serious quality and grade deterioration during storage—even for a short time.

Cotton harvested from defoliated and undefoliated fields has been compared. The moisture content of the seed cotton in the field was nine percent for the defoliated and 9.8 for the undefoliated. After harvest this had climbed to 9.8 percent for the defoliated and 11.5 percent for the undefoliated.

After 24 hours the defoliated had changed very little, but the undefoliated had jumped to 15 percent. This is enough to cause heating, which can result in spotting and other fiber deterioration. And this 24-hour waiting period is not out of the realm of reality. It will become more common as machine harvesting increases and harvest is crowded into a shorter period.

Distribution of moisture in seed cotton is also of special importance. This is getting to be more of a problem as large trailers, particularly three and four bales, become more prominent. If the first bale is picked early in the morning when it's damp, the last one in the late morning or in the afternoon when it's dry, and the other two sometime between, it's impossible for the ginner to do the best possible job on all four. He has to compromise. Quality suffers, but so does the farmer's profit.

Management Spells Success

From what I've said about successful mechanical harvesting, I think we can agree that it all boils down to management. That's the real key to success. More detailed information is available from equipment dealers, extension workers, and others. I encourage producers to obtain this information and utilize it to the fullest extent.

Mechanical harvesting has already had a big impact on our industry. In 1950 less than five percent of the crop was picked by machines. In 1960 more than 50 percent of the cotton was machine-harvested, and no end is in sight.

With this increased growth of machine harvesting has come increased need and responsibility for using it to the best advantage—and that means using good management to do the very best job possible.

My Cotton Production

Robert Lee Scarborough,
Cotton Producer, Eastover, S. C.

My farm is located in Central South Carolina in the lower portion of Richland County. Geologically, the Southeastern states can be divided into four distinct sections—coastal, sandhill, piedmont, and mountain. My farm is in the upper part of the coastal belt. This belt, with minor exceptions, is definitely the choice cotton producing section of the Southeastern states. It is frequently reftrred to as the new cotton belt of our country.

I will break down my cotton production program into 10 distinct steps. I would like for you to consider each step a link of a chain representing my total cotton progress. We are most conscious of the old truth, " A chain is no stronger than its weakest link," and constantly strive to strengthen each link to a stronger chain, always keeping in mind the practice of sound economics.

Location and Preparation

With present acreage limitations we choose our best fields for high production. This means fertile, well-drained fields that have warm natured soils. In our rotation, approximately half of our cotton crop follows soybeans, which are gathered the last of November. The other fields to be planted in cotton are usually planted in cover crops of small grain or Austrian winter peas. These fields are turned three to four weeks prior to planting to guard against germination problems.

Our lands are prepared by heavy duty disc-kilifer and smoothing harrows. Two or three trips with the disk-kilifer and one or two trips with the smoothing harrow are needed for desired preparation. Cost of our soil preparation averages about $10 per acre.

Planting Seed

The variety planted is always one recommended for our state by the Clemson Crop Varieties Recommendations Committee. It is always a wilt resistant, high yielding, early maturing one that also gives good staple length for our entire planting.

We purchase seed direct from the breeder. We can then rest assured that the seed has a high germination record, has been treated to control diseases during growth, and has been mechanically delinted, enabling us to get a quick stand. Another advantage is that if the seed produced on our farm meets the standard of the South Carolina Crop Improvement Association, it can be certified and moved as planting seed. This approval gives us a better turn than if marketed to oil mills.

We plant 17 pounds of seed per acre, which costs $2 per acre.

Fertilization

For seven or eight years fertilizing has been done at a ratio of 1-1½-2. This ratio has given desired plant growth and excellent fruiting. Seven hundred pounds of 3-12-12 per acre at planting time and top dressing with 200 pounds of 15-0-14 are used. Lime is used as a filler in all mixed fertilizer to maintain a soil higher than 6.0. Total cost of fertilizer is $18.38 per acre.

Weed and Grass Control

Since our section has varying and sometimes heavy rainfall, we consider it extremely good insurance to use a pre-emergence chemical to assist in early weed and grass control. This enables us to delay extremely early cultivation, giving the cotton time to become better established and resulting in better stands. We are in our infancy with this use as well as with post-emergence applications. Our knowledge of use and effectiveness of these chemicals will increase by experimentation and practical application. Cost for pre-emergence material is $2.50 per acre.

Planting

Planting is done around the first of April. We plant on well-prepared land with four-row equipment. Row width is 36 inches.

Planting is five operations combined into one: (1) laying off rows; (2) making seed beds; (3) applying fertilizer; (4) planting; and (5) applying pre-emergence spray.

The seed bed is relatively flat. Fertilizer is placed in a band about two inches to the side of and two inches below the seed. The planter hill drops three to seven seed approximately 13 inches apart; seed are placed about 3/4 inch deep and soil is firmed by a packing wheel. Behind the packing wheel is a spray nozzle that applies the pre-emergence spray in a band 16 inches wide. Cost of this operation is approximately $5 per acre.

Cultivation

Plowing and chopping usually begin the first day of May and last about 10 weeks. Cotton is hoed three times. For plowing, four-row cultivators are used exclusively. A top-dressing attachment is used with four-row cultivators the middle and last of May for applying 200 pounds of 15-0-14 per acre in bands three inches from each side of the plant. Usually the cotton is plowed seven or eight times before lay-by. Cost of hoeing and plowing averages $12 per acre.

Insect Control

Insect control is one of the most expensive links of our chain, even greater than a sound fertilization program. We find it most uneconomical to invest in other phases of cotton production without protecting the investment with a sound insecticide program. Emphasis should be placed on all phases to maintain a proper balance.

Insect control is the most exacting link in our chain. Choice of insecticides and timing of applications determine effectiveness of the program. We adhere to recommendations of the Clem-

son Extension Service on materials, timing, and rate of application.

Spray is preferred to dusting since effective spraying can be done practically any time. Timing, more adequate control, and economy are other advantages of spraying.

We've gotten better results and better performance with both dusting and spraying when a mix of two or more insecticides is applied. Each insecticide has a tendency to boost the other, thereby giving the benefit of "synergistic action". Using a combination of two insecticides, one having the potential of a quick kill and the other with long residual kill, increases effectiveness of the spray. Therefore, fewer applications are required. Another advantage of using two insecticides in the spray is that the combination lessens the possibility of the boll weevil resistance to the insecticide.

When the seedlings begin changing leaves, the first application of a spray that will control cotton fleahoppers, aphids, mites, and thrips is made. No other application is made until the last of May unless plants show an apparent need. One application per week to control boll weevils and bollworms is then begun. This schedule is continued until the boll weevil begins migration, which, in our section, is around July 25.

Five or six applications at four-day intervals are then made. This is a total of 13 to 15 applications per season.

First sprays are applied with an eight-row tractor until the latter part of July when the cotton is large enough to be damaged by the tractor. An airplane is used for the last applications to prevent further damage.

Average cost of the insect control program for material and application is $31.90 per acre.

Harvesting and Processing

Since local labor is available, we still hand pick all of our cotton. Enough cotton is normally open by the middle of August to begin picking. This varies from year to year.

Rank cotton is defoliated to prevent boll rot. In 1960, 70 acres of the 272½ acres planted were defoliated. Cotton is picked as promptly as possible. Pickers are encouraged to keep it free of trash and grass. Since 40 to 50 days of picking are required to gather the crop, harvest may be completed the middle of October to the first of November. Cotton is carried to the local gin each day. Being modern, the gin is equipped with dryers, lint cleaners, etc., and renders a quality job. Average cost the past five years for picking, hauling, and ginning has been $57.37 per acre.

Marketing

Being a producer of Plan A cotton for the past two years has made marketing a mechanical process of having the cotton graded by the U.S. Department of Agriculture, Cotton Classing Service, hauling of the cotton to a warehouse, paying the first month's storage, then receiving payment fixed by the government. Previously our cotton was graded by USDA and sold to the highest bidder—market or loan.

Cottonseed are always brought back from the gin and put in our farm storage bins where they are given special attention. All seed germinating better than 80 percent meet the South Carolina Crop Improvement standard for certification and are sold for planting seed. Remaining seed are sold to oil mills. Seed quality is determined in large by seasons. In some years 100 percent will be sold for planting. In other years the entire crop will be sold to the oil mills. They occasionally will be sold for both purposes.

Average cost of marketing cotton and cottonseed for the past five years was $2 per acre.

Cost of Investment

Cost of investment and overhead is divided into four parts: (1) interest on capital outlay; (2) interest on investment; (3) depreciation; and (4, miscellaneous overhead, such as taxes; record keeping, etc.

The capital outlay as given in the first nine links of the chain, totaled $140.47 per acre. Interest at six percent for six months would cost $4.15 per acre. Land well adapted to cotton is valued at $150 per acre in our area. Machinery and building investment add $125.00 per acre. Land plus machinery and building investment amounts to a total of $275 per acre of cotton, and an interest rate of five percent would add about $13.75 per acre. Depreciation would exist only on machinery and buildings with a life expectancy of 20 years. At an expense of five percent of $125, this would amount to $6.25 per acre. For miscellaneous overhead, such as taxes, record keeping, transportation, etc., we will add $5 per acre.

Therefore, the total annual cost of investment, depreciation and miscellaneous overhead is $29.15 per acre. The five year average cost of producing, harvesting, processing, and marketing one acre of cotton, including cost of investment and overhead was $169.62. Five year average receipts from the sale of cotton and cottonseed from one acre were $214.94. This gives a net income of $45.32 per acre.

I sincerely hope these observations will help you to better appraise the importance of cotton production to our area and to more intelligently appreciate the magnitude of some of our problems and endeavors.

In 1961 we plan to strip crop wheat and cotton for the first time. Advantages we anticipate are less wind and water erosion; conservation of moisture; better ventilation and lighting; accessibility to all points of the fields by automobiles and trucks, thereby allowing for better supervision and time saving; and the ability to apply defoliants and insecticides with ground equipment, thus eliminating the added expense of a hired airplane. We anticipate greater efficiency with less cost of production and larger yields of wheat and cotton.

What About The Future?

It is essential for the continuance of any sound production program that projections into the future be made. I should like to emphasize these fundamental and basic factors upon which the future of any cotton farmer depends.

■ INDUSTRY — This will mean more employment and added purchasing power.

■ ATTITUDE — We can't afford to accept a "can't" philosophy in cotton production. We should not ignore the importance of preserving our industry.

■ RESEARCH — Great advances in chemistry, plant breeding and mechanization have been made, but more research is needed.

■ MARKETS—More stress must be put on the promotion and outlets of our product. Here is a place for greater research.

■ GOVERNMENT PROGRAM—The future of our cotton production depends upon overall actions in Washington.

■ SIZE OPERATION—It is essential that a farm have enough cotton allotment for economical operation.

■ VOLUME PRODUCTION — This must be maintained to preserve our advantage in having available good ginning facilities, ample storage, oil mills, cotton spindles, and people with "know-how".

■ INFORMED FARMERS—The degree to which a cotton farmer keeps himself abreast of the fast changes occurring in cotton and the degree to which he applies sound production practices will have a tremendous effect upon our future.

■ COST-PRICE RATIO — A very healthy cost-price ratio is necessary because very few cotton farmers can afford to pay for the privilege of producing cotton for the pleasure it affords.

■ TEAM EFFORT—This is essential for the welfare of all those connected directly or indirectly with cotton. The National Cotton Council is doing a splendid job in coordinating the efforts of all those connected with cotton in various basic and essential services such as research and promotion.

The future of the cotton farmer does

(Continued on Page 47)

Rainey Joins Gordin

BILL RAINEY has been appointed West Texas sales representative for Gordin Unit System, Inc. In making the announcement, John T. Gordin, president, said, "We are particularly fortunate in having Bill Rainey join our organization. His broad background of experience in gin machinery sales and his knowledge of the equipment problems confronting ginners will make his services most valuable." Rainey will be located in Lubbock at 2505 Sixty-first Street.

Classified Advertising

RATES AND CLOSING DATES: Ten cents per word per insertion. Include your firm name and address in making word count. Minimum charge $2.00. Copy must be in our hands by Thursday morning of week of issue. Please write plainly.

Oil Mill Equipment for Sale

FOR SALE—Modern rebuilt Anderson Expellers. French screw presses for specific oleaginous products.—Pittock & Associates, Glen Riddle, Pa.

FOR SALE—2 French 4-cage screw presses, 9" extension. French 60" rolls. Carver 141-saw linters. Carver Truline Gummer. Bauer 199-60" seed cleaner, 198 hull beater, 153 separating units. Butters 141-saw machines. 36" Chandler hullers. 36" attrition mills. All-steel sand and boll reel. 72" French cookers. Fort Worth lint cleaners. Exhaust fans.—Sproles & Cook Machinery Co., Inc., 159 Howell Street, Dallas, Texas. Telephone: RI-7-5958.

FOR SALE — French 5-Hi 48" crushing rolls. Screening tanks. Filter presses. Bar and disc hullers. Cookers. Attriction mills.—V. A. Lessor & Co., P. O. Box 108, Fort Worth, Texas.

FOR SALE—No. 199-60" Bauer cleaners, Bauer attrition mill, and Chandler hullers. All complete and reconditioncd. Write Box 11052, Fort Worth, Texas.

Gin Equipment for Sale

FOR SALE—3-90 saw Gullett brush gin stands, 6-80 saw Murray gin stands, 4-80 Continental Model C gin stands, Murray all-steel, down-packing press with tramper and pump, 2-10' Continental bur machines, can be used as extra spare parts—cheap. Several Mitchell 60" and 66" Super Units to be used as spare parts—cheap. Sheaves, pulleys, floor stands, line shafting, piping, telescopes, etc. Give us a list of your wants and needs.—Sam Clements, Phone RE 5-3764, Box 86, West Memphis, Ark.

FOR SALE—Two Continental DFB lint cleaners, 1959 Model. A1 condition. Complete with mechanical drive.—Box P12, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

FOR SALE OR TRADE—2-10' Continental bur machines, type 1B10, Model 500, Serial 740 LH and 708 RH with bypass intake transition, spreader conveyor, discharge conveyor, and complete catwalks and steel supports. 1 type S Model 500 Continental down-packing press, No. 705 complete with pump. Also, will sell or trade a good up-packing Continental or other make all-steel press. —Deming Gin, Inc., Box 819, Deming, New Mexico. Phone: 546-9632 for Bill Griffin.

TO BE MOVED

One complete 4-80 Murray cotton gin with Mitchell feeders; double drying; two natural gas engines; bur machine; impact cleaner; horizontal cleaner; seed scales; wagon scales; all-steel down-packing press. All of this machinery is in good condition and can be set up at your location at a big saving to you.

For complete details call or write

Swift & Company Oil Mill
Little Rock, Arkansas
Telephone FR-4-0238

FOR SALE—Seed scales, Lummus pulley and shafting, seed elevators, Dixie tramper, and a few other items.—M. A. Holscher, Travis, Texas.

HARDWICKE-ETTER—All You Need to Know About Gin Machinery.

GINNERS—Do you have enough capacity? We have one of the answers for you.—Sam Clements, Phone RE 5-3764, Box 86, West Memphis, Ark.

FOR SALE—Three complete modern gins. To be moved. Equipped with driers, lint cleaners and steel buildings.—Jim Hall, 1503 Cotton Exchange Building, P. O. Box 751, Dallas, Texas, or telephone RI-1-1393.

COMPLETE GIN FOR SALE—All-steel 5-80 Lummus airblast gin, built in 1948. Twin GMC diesel motors, 1 Lummus burner, Lummus inclined cleaner and Thermo, 1 Moss Constellation cleaner, up-packing steel press. This gin is in irrigated area. $65,000 clear, $30,000 cash.—Storie Gin, Phone 495-2090, P. O. Box 558, Post, Texas.

FOR SALE—One completely converted Continental DFB lint cleaner in excellent condition. Make us an offer.—Box D12, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

FOR SALE—One completely reconditioned Moss Cleanmaster with condenser, fans and 5-h.p. motor. Hardwicke-Etter and Lummus lint cleaners. One right-hand, double box, all-steel, up-packing Murray swing door press with ram and casing and Continental EJ tramper. STEEL BUR MACHINES: 1-14' Hardwicke-Etter right-hand and 2-10' Lummus center feed. STEEL CLEANERS: 2-72" Continental Impacts, 5-, 6- and 7-cylinder 52" Murray blow-ins with V-drive. 2-50" Continental inclines. 5- and 6-cylinder Hardwicke-Etter and two 6-cylinder Gullett blow-ins. 6-cylinder Stacy and Lummus Thermo. 3-90 saw Hardwicke-Etter conveyor distributor. Murray and Hardwicke-Etter press pumps. 6-80 saw Murray glass front gins with Super Mitchells, complete with lint flue and couplings. New tower driers. Mitchell and Service Gin Company heaters. 9" screw elevator. New flat and V-belting and a general line of conveyor and transmission equipment. For your largest, oldest and most reliable source of used and reconditioned gin machinery, contact us. Call us regarding any machinery or complete gin plants which you have for sale or trade.—R. B. Strickland & Co., 13-A Hackberry St., Phone: Day PL-2-8141, Night PL-3-2219, Waco, Texas.

TWO COTTON GINS
MISSISSIPPI DELTA LOCATIONS

One Gullett 4-80 with tandem Moss-Gordin lint cleaning; double drying; bur machine; stick and green leaf machine; adequate precleaning; natural gas power; concrete block building.

One Murray 5-80 with Moss-Gordin lint cleaner; double drying; complete precleaning; natural gas power; cotton house; two sets wagon scales; metal clad building.

Both gins located in good cotton producing areas and with good potential for aggressive, live wire operator. These gins can be bought worth the money with good financing.

For complete details call or write

Swift & Company Oil Mill
Little Rock, Arkansas
Telephone FR-4-0238

FOR SALE—1959 Continental DFB lint cleaner complete with motors. Excellent condition. Ginned very little cotton.—Box H5, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

FOR SALE—Single Unit Moss heat cleaner.—Bradford Gin Company. Call or write J. B. Fuqua & Sons, Phone MU 6-1451, Milan, Tennessee.

FOR SALE—Complete Continental equipped gin to be moved. No buildings. 4-80 saw gins, perfection cleaners with green leaf and stick, incline, impact and D.F.B. lint cleaners; tower drier with 2M heater (gas) all-steel up-packing paragon press and pump; all motors; 15-ton 30' Fairbanks Type S truck scale; one bale platform scale; distributor and transmission equipment; 1300 bales, 1960. —The Service Company, P. O. Box 626, Forrest City, Arkansas. Phone MElrose 3-2437.

FOR SALE OR TRADE—Almost new 24-shelf Hardwicke-Etter tower drier. Will buy or trade for 4-trough Continental drier. — West Hub Gin, Friona, Texas. Phone Hub 2705.

DISMANTLING 5-70 Lummus airblast, good saws and ribs, lint flue, Mitchell feeders, V-belts, BB 6-cylinder cleaner, condenser, down-packing press, tramper, hydraulic pump V-belted to motor, 40" airblast fan, seed elevator and scales, heat recorder, belt distributor, 9 x 16 scale, shafting and pulleys, 10,000 gallon steel tank, belting.—B. F. Mixon, Runge, Texas. Phone CE 9-4484.

FOR SALE—Three extra good late model 80-saw Murray gin stands for submerged lint flue, 4 reconditioned 67" Master double X Continental feeders, 1-70" Hardwicke-Etter separator, extra saw cylinders for 80-saw Continental and Murray gins, gratefalls for 80- and 90-saw Continental gins, various size fans.—Kimbell Used Gin Machinery Co., Box 456, Phone 257-3372, Earth, Texas.

FOR SALE—Complete outfits to be moved: 5-90 Continental, double drying, double cleaning, double lint cleaning. 5-80 F3 Continental, double drying, double cleaning, double lint cleaning. 5-80 F3 Continental, single drying, single cleaning, double lint cleaning and Moss and steel building. 4-80 F3 Continental, single drying, single cleaning and lint cleaners and electric power. 3-80 Hardwicke-Etter, double drying, double cleaning, double lint cleaning and Moss with LeRoi power. Good, clean, complete, all-steel outfits ready for your inspection.—Sam Clements, Phone RE 5-3764, Box 86, West Memphis, Ark.

FOR SALE—One complete Lummus 3-80 automatic brush, Lummus down-packing steel-bound press, GM 6-cylinder diesel motor, ginned less than 9,000 bales. One complete 3-80 Continental, 4X feeders, up-packing, steel-bound press with 75 h.p. electric motor. Bargains.—Arvil Decker, Rt. 3, Crossville, Alabama.

FOR SALE—4-60" Standard Mitchell feeders, good shape. Will sell cheap. Contact Smith Gin and Seed Company, Winder, Georgia.

FOR SALE—One 5-90 saw Continental outfit and one 5-80 saw Continental outfit, both plants to be moved. Machinery in excellent condition.—Sebastian Farmers Gin, Sebastian, Texas. J. A. Krueger, mgr.

Equipment Wanted

WANTED—One Moss Cleanmaster or Constellation lint cleaner. Must be in good condition. Box A14, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

WANTED—French or Davidson-Kennedy SOYBEAN CONDITIONER, good operating condition, all plate-steel construction, six high 80" to 90" diameter super-imposed, steam jacketed kettles about 30" deep, complete with vertical shaft and 220/440-3-60 TEFC motor drive assembly, kettle ring jackets to carry 150 lbs. psi steam pressure. With or without motor. State full details and price f.o.b. present location. Address Box N15, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

WANTED—One 200 h.p. BB 440-3-60 900 RPM motor, starter and base. Two 50 h.p. 440-3-60 oil starters, GE Type 1034.—Box 13, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

WANTED—2-14' Hardwicke-Etter or late model Murray or Continental bur machines. Double 35", 40", and 45" fans.—R. W. Kimbell, Box 456, Phones 257-3372 or 257-3351, Earth, Texas.

WANTED—72" Continental Impact cleaner, separator and tower drier.—Box M9, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

WANTED—One Lummus steel down-packing long box press and tramper.—Box X-7, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

Reconditioned Murray
90 Saw Safety Gin

FOR QUALITY
RECONDITIONED
GIN MACHINERY
World's Largest Stock
CONTACT
BILL SMITH
P. O. Box 694 **Abilene, Texas**
Phones: OR 4-9626—OR 4-7847

WANTED—One all-steel press complete with ram, packer, and pump. Two cleaners, one tower drier with burner, one dropper, fans, and electric motors.—Violet Gin Company, Inc., Rt. 3, Robstown, Texas.

WANTED—Used steel-bound press, pump, tramper, Bauer seed cleaner and Clipper cleaner—West Hub Gin, Friona, Texas. Phone Hub 2705.

WANTED—One wagon or truck scale 16' or longer. Quote price, make, size, and condition. Mail reply to Room 120, Whiteside Bldg., Lubbock, Texas.

Personnel Ads

WELL QUALIFIED cotton ginner desires connection with large organization as superintendent or assistant superintendent. Competent gin repairs. Honest, cooperative, resourceful. Also frame construction.—Box G10, The Cotton Gin and Oil Mill Press, P. O. Box 7985, Dallas 26, Texas.

Power Units and Miscellaneous

SEE US FOR PARTS on all models Minneapolis-Moline engines and Seal-Skin belt dressing.—Fort Worth Machinery Company, 913 E. Berry St., P. O. Box 1575, Fort Worth, Texas.

SCALES FOR SALE: Authorized Fairbanks, Morse scale dealer. New and used scales. Guaranteed service anywhere, anytime—Lewis Scale Service, Clarence E. Lewis, 616 Avenue A, Lubbock, Texas. Phone PO 3-4271 or SH 7-1857.

MELVIN U. TINSLEY
Cotton Gin and Oil Mill
Evaluations
212 Commercial Bldg. Office: TW 3-3711
Sherman, Texas Res.: TW 3-4011

SALES—Service—Repair—Installation—All makes of scales. Used scales taken on consignment. Fairbanks-Morse distributor, 20,000 lb. test unit, large stock of used motor truck and railroad track scales.—Industrial Scale and Equipment Co., Phone OR 2-8336, 7014 Force St., Houston, Texas, and McAllen, Texas, Phone MU 6-1651.

USED ENGINES FOR SALE—Three sets 1210A, M & M, 220 h.p., natural gas, in good condition; one 1RSXTV, V-8, LeRoi, 220 h.p., natural gas or butane, less outboard bearing, ready to run; one PC2505, 300 h.p., straight eight, Buda, extra good condition. For further information contact: Lubbock Electric Company, 1108 34th Street, Lubbock, Texas. Phone: SH 4-2336.

FOR SALE—One MM 180 h.p. 6-cylinder natural gas engine. One 48' 18" 8-ply belt. One 40' 18" double Conecho leather belt.—Contact Edwin J. Gerik, Whitney Gin Co., Whitney, Texas. Phone 2911.

ACMI Slates Miami Meeting

A record attendance is expected for the twelfth annual meeting of American Cotton Manufacturers Institute, March 23-25, in Miami Beach at The Fontainebleau Hotel. The board of directors will meet March 22, prior to the convention.

Tung Oil Offered

Starting Jan. 24, USDA is offering tung oil for unrestricted sale out of CCC stocks.

Murray Holds General Sales Meeting in Dallas

SHOWN HERE are those who participated in the recent general sales meeting of The Murray Co. of Texas in Dallas. In outlining sales plans for 1961, it was announced that Murray will offer a practical moisture control unit.

• Stoneville Meeting Reviews Research

GINNING RESEARCH at the Stoneville Ginning Laboratory of USDA was reviewed by 40 ginning and cotton industry leaders on Jan. 6. States served primarily by the Laboratory were represented at the meeting in Mississippi.

John H. Freeman, Jr., Greenwood, chairman of the Delta Council Ginning Improvement Committee, outlined the objectives. Delta Council was host at lunch. Among those at the meeting were:

MISSISSIPPI — John Freeman; Luther W. Wade, Greenwood; George Baird, Sr., Inverness; Eugene Fisackery, Blaine; Dozier Lester, Inverness; C. M. Jones, Inverness; Emory Rose, Stoneville; F. L. Gerdes, Leland; L. H. Moseley, Stoneville; Garner Lester, Jackson; Gordon W. Marks, Jackson; and B. F. Smith, Stoneville.

ARKANSAS — Kemper Bruton, Blytheville; Jack Dante, Dumas; Dan Felton, Jr., Marianna; Robert D. Pugh, Portland; Lon Mann, Marianna; Frank Hyneman, Truman.

LOUISIANA—L. N. Pipes, West Monroe; C. L. Williamson, Alexandria; H. L. Southall, Alexandria; W. P. Hayne and Chris Hayne, Alexandria; Harvey Grant, Delhi; George B. Franklin, Jr., Holly Ridge; Keener Howard, Lake Providence; Duke Shackelford, Jones; Foster Wallace, West Monroe; Charles Severance, Baton Rouge.

MISSOURI—E. D. Barrett, Hornersville; William A. Joplin, Jr., Hayti; William F. Sikes, Sikeston; A. B. Boyd, Jr., Campbell.

TENNESSEE—Harold Willams, Jackson; John Gauldin, Dyersburg; Pat Mann, Brownsville; K. O. Mullen, Knoxville; Allen Robertson, Ridgely; and Hershel McCrae, Memphis.

TEXAS—Ed Bush, Dallas; James Walsh, Mission; Orville Bailey, Anton; and Hans B. Nelson, Bartlett.

Vernon P. Moore, Stoneville; Dr. Walter M. Carleton, Beltsville, Md.; C. Scott Shaw, Stoneville; Oliver McCaskill, Stoneville; E. A. Harrell, Stoneville; and Clyde Griffin, Stoneville, represented the Ginning Laboratory.

Five Secretaries on Forum

Five men who have been U.S. Secretary of Agriculture will appear on a Michigan State Forum on Feb. 1. Discussing "Agriculture in an Uneasy World," will be former Secretaries Henry A. Wallace, Claude R. Wickard, Clinton P. Anderson, Charles F. Brannan and Ezra Taft Benson.

■ **NORMAN KRUSE, vice-president and technical director, Central Soya, Decatur, Ind., died during January following a heart attack at his home.**

GINNERS and others who attended the recent meeting at USDA Cotton Ginning Laboratory, Stoneville, Miss., are pictured here.

Proctor & Gamble
Stock Split Proposed

A two-for-one stock split has been proposed, subject to stockholder approval, by Procter & Gamble Co. Directors also announced that they plan to increase the dividend basis from the present 65-cent rate to the equivalent of 70 cents on the present stock.

A meeting will be held March 14 on the proposal.

Fog Delays Harvesting

Foggy weather has delayed cotton harvesting and ginning in the area around McFarland, Kern County, California, ginners report. About 4,000 bales were ginned after Jan. 1.

Ginners said they were finding use of moisture meters especially helpful for proper ginning under 1960-61 conditions.

New Bracero Organization

A new organization, Terry County Users Association, has been formed in the West Texas area to deal with Mexican farm labor. A former organization has been declared ineligible to participate because of alleged failure to meet U.S.-Mexican Labor Departments' requirements.

New Mexico Meeting Set

The annual meeting of the 1517 Cotton Association will be held Jan. 25 at Artesia, N.M.

Gin Moisture Study Results Issued

Preliminary, but complete, results of the 1959-60 survey of ginning moisture in Texas have been published by Cotton Economic Research, University of Texas, Austin.

Texas Cotton Ginners Association requested the Cotton Research Committee of Texas to make the study, the most comprehensive survey that has been made to determine moisture conditions in cotton at gins, and its influence on cotton quality.

A report on the first results of this survey was published early in 1960 in The Cotton Gin and Oil Mill Press, official publication for Texas Ginners Association.

The report now issued lists a number of conclusions, but stresses that these are based upon one year of a two-year study, and another preliminary report will be made before the final publication. Among the comments to date are these:

1. Cotton brought to Texas gins varies widely in moisture content due to environmental and harvesting conditions.

2. The moisture problem insofar as level is concerned, is different for many of the various cotton producing areas in Texas. The Lower Rio Grande Valley, Coastal Bend, interior coastal plains and the Colorado and Brazos river areas have relatively large amounts of moisture in the air and the cotton. These same areas are plentiful in rain and have a relative humidity of 60 percent or better during most of the harvesting season. The other areas located to the north and west have less rain, less relative humidity, more wind, and sharper variations between the daily high and low temperatures. Thus, it is normal to expect less moisture to be found in the cotton and in the air in these areas than in these located farther south.

3. Spinning test results show that a five to seven percent moisture content in the cotton at the gin stand produces better spinning cottons than either higher or lower moisture content.

4. The spinning tests showed that the most critical point for proper moisture control is at the feeding apron, or immediately preceeding the gin stand, because damage done to cottons below or above the five to seven percent range occurs in the gin stand. This damage cannot be corrected by altering the moisture content later in the ginning process.

5. It was found that the 15 to 20 pound spinning test samples were too small to give conclusive results and adequate correlations. Because of this, the project has been revised to provide, in the 1960-1961 season, at least 150 pounds of cotton for each spinning test. It is estimated that this amount will give approximately 5,000 spindle hours per test when spinning 30's and 40's yarns. A 5,000 spindle hours test is considered adequate for conclusive correlation of endsdown data.

6. For the Texas crop in 1959-1960, 72.8 percent was ginned at above five percent moisture. Of the relatively small amount of the crop which was ginned at below five percent moisture, 20 percent was not due to over drying but to the weather conditions at time of harvest.

7. The moisture content of cotton delivered to Texas gins ranged from a high of 13.8 percent to a low of 3.8 percent in 1959-1960.

8. Air temperatures in Texas where cotton was ginned and during the ginning season ranged from a high of 103 degrees to a low of 36 degrees.

9. Relative humidity in Texas varied where cotton was ginned and during the ginning season from a high of 88 percent to a low of 12 percent.

belton superior bagging
the best protection against handling and weather
2 lb. weight—21 lbs. TARE
Open weave Jute Bagging
Pretested for uniform strength
Makes cleaner, stronger bales
"Built to Stand the Pressure"
BELTON BAGGING CO.
Belton, South Carolina

In Mexico

Mill Superintendents Slate Meeting

The Palace of Fine Arts, one of the showplaces of Mexico City, will serve as registration headquarters for the divisional meeting of Mexican International Oil Mill Superintendents Association.

The Association will meet Feb. 6-10 with the first national convention of Producers of Oleaginous Materials of Mexico. Sessions will be held at the National College of Agriculture, Chapingo. Convention chairmen are Sr. Jorge Martin Ruiz, for the superintendents, and Ing. Enrique Espinoza Vicente, for the producers.

50 Years Old
Fafnir Plans Celebration

President Clarence G. Rosensweig has announced that Fafnir Bearing Co. will observe its golden anniversary during March. A program of special activities will include an open house at the firm's expanded Newington plant.

Many Bales in Fields

More than 15,000 bales of cotton were left in the fields in Floyd County, Texas, at mid-January, a survey of 22 gins indicated.

Ginners said the crop was 109,663 bales, about 4,000 bales smaller than earlier estimates.

Labor Force Decreases

Farm labor supplies averaged 7,100,000 persons in 1960, down four percent from the 1959 level. Of the total, 5,200,000 are members of the farm family.

■ **DR. EARL BERKLEY, for many years director of the ACCO Fiber Laboratory in Houston, now is with Decring-Milliken's research center at Spartanburg, S.C.**

(Continued from Page 43)

not depend upon one factor, but a combination of factors. The future of those participating in cotton production presents complexity as well as a most entertaining and interesting challenge.

Success cannot be measured merely in terms of monetary income, but the satisfaction one receives in the progress of his endeavor is a reward I have found to be worthwhile.

Panel Discussion | Pest Control and Harvest Aid Guides for 1961

■ **Hervey Evans, Jr., Panel Leader, Cotton Producer, Laurinburg, N. C.**

Diseases:

■ **Dr. John T. Presley, Leader, Cotton Pathology Investigations, ARS-USDA, Beltsville, Md.**

A number of cotton diseases, such as verticillium wilt, fusarium wilt, bacterial blight, seedling diseases, and boll rots, constitute a hazard to profitable production and also to lint and seed quality. Basic as well as applied research is being directed toward development of measures for minimizing these losses and reducing production costs.

• **Bacterial Blight**—Rex, a blight resistant variety, is increasing in popularity in Delta areas of Arkansas and Missouri where bacterial blight is extremely damaging. Blight resistance also has been transferred to Auburn 56, a variety highly resistant to fusarium wilt and tolerant to root-knot nematode. This variety should be released soon and should be very popular in areas where the root-knot nematode is damaging. In certain areas of western Oklahoma, eastern New Mexico, and southwest Texas, Race 2 is building up as a result of the use of Race 1 resistant varieties.

Basic breeding stocks carrying resistance to both races of the blight organisms now are being used in accelerated breeding programs to further reduce losses from this disease. Studies are also under way on the mutability of the blight organism. These studies are furnishing information on potential races which might rise from currently existing races through mutation. Genetically stable mutants have been isolated which differ from the parent types in pathogenicity. Efforts are being directed toward the development of breeding stocks carrying resistance to the mutant forms.

• **Fusarium Wilt**—Losses from fusarium wilt are being substantially reduced through increased use of resistant varieties in many areas of the Southwest. Auburn 56, Rex, Coker 100 Wilt, and Empire are among the varieties being used in these areas. Thousands of selections and introductions are being screened each year. This service is valuable to cotton breeders who are developing resistant varieties and also in the search for new sources of resistant germ plasm.

• **Verticillium Wilt**—The production hazard resulting from verticillium wilt in certain areas of Arizona, New Mexico, West Texas, and Western Oklahoma is increasing each year with commensurate yield losses and quality reductions. Disease reaction of currently used varieties indicates that none has sufficient tolerance to withstand the ravages of the disease when conditions are optimum for its development.

However, there is sufficient tolerance in such varieties as Acala 4-42, 1517-D, Pima S-1, and Pima S-2, to permit continued production of cotton under average verticillium wilt conditions. With continued selection pressure for tolerance within these varieties, the present level of tolerance can be maintained or possibly improved.

• **Nematode** and Nematode Disease Complexes—Research has shown that at least 10 different species of nematodes attack the cotton plant at some time during its life cycle and that many of these species occur across the entire Belt. Evidence continues to accumulate which strongly suggests that nematodes are contributing factors to rhizoctonia damage in the seedling stage, to generally lower vitality of seedlings and to the incidence and severity of fusarium wilt. Through use of soil fumigation and nematode tolerant varieties such as Auburn 56, losses may be substantially reduced. Recently crosses have been made between a wild cotton and a cultivated Upland type. Resulting hybrids have a degree of resistance that approaches immunity to root-knot nematodes. Studies on the effect of single nematode species or combinations of species under controlled conditions are in progress. From this research, valuable information is being obtained on the build-up potential of different species and on the reaction of the cotton plant at different growth stages to various nematodes.

• **Seedling Diseases,** Seedling Vigor, and Cold Tolerance—A uniform and vigorous stand is of prime importance in efficient production. It has been said that "however much the knowledge and skills of man have improved, our very lives depend on sowing good seed well, at a good time, and in a good place." This is especially true of cotton where efforts are being made to completely mechanize the crop. The seedling disease complex including post-emergence damping off, accounts for about one-fourth of the total disease loss in cotton. In certain areas where losses are especially damaging to stands, soil fungicides applied at planting are useful as a supplement to seed treatment.

Cost of seed treatment and the soil fungicides is sufficiently economical for use in any cotton growing area where average production is one bale per acre or more. In most controlled experiments, the increase in yield resulting from use of soil fungicides in addition to seed treatment has paid for cost of application many times. Tolerance to low temperatures has been shown to be associated with high seed quality. The lower the seed quality the more susceptible resulting seedlings are to low temperatures. This is indicated by reduced germination and increased susceptibility to seedling disease.

• **Field Deterioration of Cotton** — Boll rots as well as other types of fiber deterioration are known to occur in over-fertilized or over-irrigated cotton and also where insects have not been controlled. Boll-rot is rapidly becoming of major importance across the entire Belt. A survey in a leading cotton producing state in the Southwest revealed that in some fields, fungal infection of bolls approached 100 percent. Damage to strength and grade caused by fungal infection of bolls is causing serious concern in the cotton trade. Bottom defoliation and skip-row planting are helpful in reducing boll rots and fiber deterioration by permitting passage of air and light to dry and open the bolls. Avoiding over-grown plants from excessive water and fertilizer also reduces boll-rot. Fungicides applied with insecticides are being tried as additional protection against boll rots.

Weeds:

■ **Dr. John T. Holstun, Jr., Agronomist, ARS-USDA, Delta Branch Experiment Station, Stoneville, Miss.**

The only major change in guides for weed control in cotton for 1961 is an expansion in recommendations for chemical lay-by. Other changes are primarily refinements of previous recommendations.

Application of pre-emergence herbicides, post-emergence use of herbicidal oil, flame cultivation, chemical lay-by, and chemical spot-treatment of perennial weeds are modern weed control partices which will be recommended by 6 to 14 of the major cotton producing states.

• **Pre-emergence**—Recommendations for control of annual weeds with pre-emergence herbicides remain essentially unchanged for 1961. Isopropyl N (3-chlorophenyl) carbamate (CIPC) and 3-(3, 4-dichlorophenyl)-1, 1-dimethylurea (diuron) are recommended as band treatments to about one-third of the row width in all major cotton producing states except California, New Mexico, and Arizona. Within states where pre-emergence herbicides are used, recommendations vary because of differences in soil type, species of weeds, or cultural practices.

Control of weeds with pre-emergence herbicides has been most successful when moderate rainfall follows application within a few days. In the absence of rain weeds often emerge unharmed from moist sub-surface depths. If essentially perfect initial control is obtained, shielded cultivation (no soil moved into drill area) of untreated middles will provide needed control for three to seven weeks after emergence. If initial control is considerably less than perfect, immediate control of surviving weeds by other methods is imperative. Post-emergence herbicidal oil, dirting cultivation, rotary hoeing, and hand-hoeing are the currently available choices.

Replanting cotton on land which has

(Continued on Page 54)

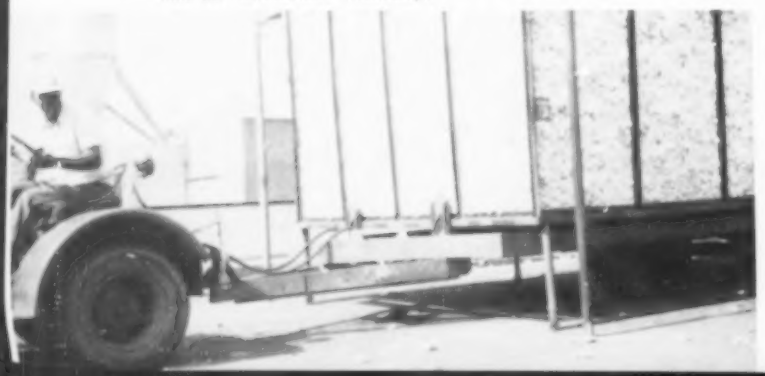
EMPTY BASKETS ON GIN YARD: Basket dimensions: 25 feet long, 10 feet wide, 8 feet high, not including legs. Capacity is 10 bales of machine picked cotton (1,550 pounds of seed cotton per bale). Pipes extending above baskets support the ridge pole which supports "tarp" for proper runoff of rainwater.

FIRST FEW BASKETS of 1960 crop filled for ginning at later date. Note eight steel legs to the basket, four on each side. These legs are mounted on 2 x $\frac{1}{2}$ inch flat steel bar for ground support. Also note uniformity of "tarp" placements and drainage "pitch" created by ridge pole.

SIDE VIEW of unloading center showing (left to right) trailer ready for unloading, basket in position to receive seed cotton, and filled basket attached to lifter. The four vertical poles surrounding the filled basket are part of the "tarping" device.

END VIEW of unloading center. Note conveyor distributing cotton. Worker at upper center is helping "spread" load evenly. Machinery (left to right): double suctions, green boll and rock trap, air separator over conveyor, high efficiency dust cyclones. Photo at right shows close-up. Note front view of "lifter" tractor at lower center. "Tarping" area at left.

CLOSE-UP VIEW of "lifter" preparing to raise and move basket. Note basket legs on ground (riding the 2 inch steel bar in "snowshoe" fashion).



Basket Storage for Seed Cotton

(Continued from Page 9)

inexpensively. We are well pleased with the baskets built by Barker Brothers Iron Works of Wasco.

In fact, at the end of the 1959 season we were so pleased with the entire operation of the storage system that we increased our number of baskets from 400 to 500. This gave us a flexible storage system of 5,000 bales to use during the 1960 crop season. We operate these 500 baskets with two lifters and one unloading system. The unloading system handles 15 to 18 bales per hour from trailer to basket.

This arrangement has allowed us either to gin all the cotton which comes to the gin yard within 48 hours or to put it in baskets, thus allowing the producers' trailers to be returned to the farm. Before we had the basket system we frequently were six days behind.

The accompanying aerial photograph of the complete gin yard, taken on Oct. 25, 1960, shows the relatively small number of trailers on the gin yard compared with the large number of filled baskets waiting to be ginned. The photograph further shows the empty baskets in reserve and the filling operation going on at the unloading center. (Circled)

In the 4,000 bales of cotton stored in baskets in 1959, we suffered no loss from gin fires. Several fires were discovered in the trailers at the time of unloading, but these fires were, of course, eliminated and no fire loss was experienced during the storage period. Insurance cost is about four cents per bale for seed cotton stored in baskets.

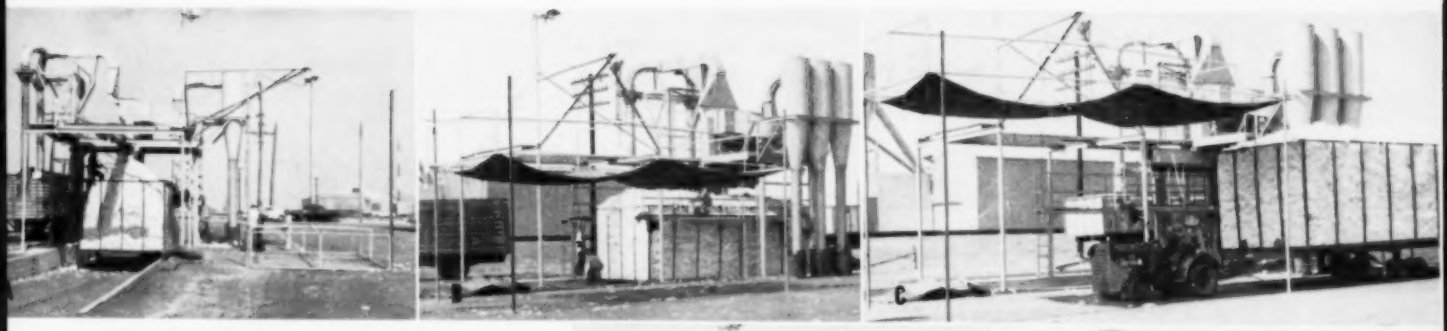
We use a five or six man crew to transfer cotton from the customers' trailers at the unloading center. This crew consists of one unloader, two spreaders, two tractor drivers, and one "tarper." Last season we found it rather time-consuming and costly to place properly the tarpaulin over the basket for weather protection. So, we devised a simple tarpaulin hoisting arrangement which considerably reduces the time and cost of doing this job. We used 12-foot by 27-foot weather-proofed tarpaulins placed over a horizontal steel ridge pole. These tarps cost us slightly more than $22 each purchased in large lots. Our per bale labor cost for the entire crew in 1959 was between $1 and $1.15. We feel that the experience we have gained, plus the time-saving tarping device, will cut this labor cost for the current year to between 60 cents and 75 cents per bale.

Our entire investment on 5,000 bales of storage runs approximately $119,000. This investment includes the 500 baskets to store 5,000 bales, the somewhat elaborate unloading system, two lifters with tractors, and the tarping device. Incidentally, the equipment for the unloading system cost about $9,000. We believe the total operating cost of the gin yard storage, including labor costs, depreciation, power, and other expenses, will

PHOTOGRAPHS, on these two pages, courtesy Lyle M. Carter, USDA agricultural engineer, Shafter, Calif.

CLOSE-UP of "lifter" with basket in raised position. Note legs off ground. Also note hydraulic hose from lifter to tractor.

CLOSE-UP of hydraulic system and tandem wheels supporting basket in raised position.



OPERATION of the "tarping" device is shown in these five photos. (A) Note frame on ground. Tarpaulin has been spread and holes in tarp buttoned over rigid fingers attached to frame. (B) Frame with tarp affixed is electrically raised by small hoist (top center). Position of frame is controlled by steel posts to prevent shift due to wind. (C) Frame and tarpaulin in raised position as freshly loaded basket arrives. Ridge pole has been laid in each "crotch" of the three vertical ridge pole supports. Note fluffy condition of machine picked cotton in basket. (D) Frame is lowered over basket and leaves tarpaulin in correct position to be tied down. (E) Tarp affixed, frame raised and filled basket ready for movement to storage yard.

run between $2.50 and $3.25 per bale, probably nearer the lower figure.

We have found that the air from the unloading system will reduce the moisture in relatively dry lint under our low humidity conditions by about one-half percent. It will generally reduce seed cotton with 10 percent lint moisture by about two percent to two and one-half percent. For this reason, we do not select for storage seed cotton in the customer's trailers which contains more than 10½ percent moisture. This 10½ percent in the trailer results in about eight percent to eight and one-half percent lint moisture in the basket. Obviously, seed cotton selected for storage must have reasonably dry cottonseed.

So, we like the basket system. If the need arises, we can store more cotton in the future by simply building more baskets. Since we **never** allow cotton to be tramped into the baskets, it is always loose and fluffy and this allows us to operate our gin machinery more uniformly and efficiently. The moisture in the lint has pretty well reached an equi-

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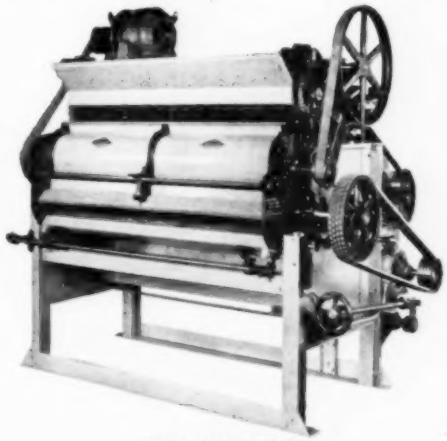

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librium throughout the basket so that we can set our drying and cleaning equipment to do the best ginning job without the usual worries of wet and dry spots within the trailer and the companion problem of seed cotton chunks which are more difficult to pick up with the suction.

Again, let me state that we do not claim to have invented the basket system. Far from it, because we have watched others use baskets of various types for several years. We do feel, however, that we have adapted numerous ideas, including many of our own, into a system which relieves us of some of the pressure of the shortened harvest season. For example, the lifter, which enables us to pick up a basket containing 15,000 pounds of cotton in a matter of 15 or 20 seconds, has made such systems more practical, more flexible and more adaptable.

In the accompanying photographs I have tried to show briefly how the various parts of the system work for us.

This information has been furnished to the Extension Service so that other ginners faced with similar problems may know of our experience with the basket system. Anyone interested further will be welcome to visit our gin at Wasco at any time.

J. A. Brawley Dies in Dallas

James A. Brawley, John E. Mitchell Co. traffic manager, died at Dallas on Jan. 12.

Survivors are his wife; two daughters, Mrs. C. G. Griffin of Alamogordo, N.M., and Mrs. Jack McAnally of Dallas; his mother, Mrs. J. S. Brawley of Fort Worth; two sisters, Mrs. George McCulley and Mrs. Claude Sharp of Fort Worth, and three grandchildren.

Shortening Price Raised

Proctor & Gamble raised wholesale shortening prices last weekend for the first change in price since November.

Texas Crushers Hold Sales Clinic

Representatives of Texas cotton oil mills were in Dallas, as this issue went to press, attending a Sales Clinic sponsored by the Texas Cottonseed Crushers Association. Sessions were at the Baker Hotel. Pictures and a more complete report will appear in the next issue of The Press.

• Perbix Heads P&G Buying in U.S.

PROCTER & GAMBLE Co. has announced the appointment of George H. Perbix to the newly-created position of manager of the general buying department.

Perbix is now responsible for all buying activities of Procter & Gamble in the U.S.

A native of Jacksonville, Ill., Perbix, 36, joined Procter & Gamble in 1949 following his graduation from Harvard University Graduate School of Business Administration. He has spent his entire P&G career in the company's buying operations, including positions as manager of the New York buying office, manager of the buying department fats and oils division and, most recently, as manager of chemical and agricultural commodities buying.

Perbix is married to the former Jean Wilkinson, of Jacksonville, Ill. The couple and their four children, three daughters and one son, reside at 6900 Miami Bluff Drive, Mariemont 27, Ohio.

■ **S. L. (BILL) MALONE has been promoted to vice-president, sales, Fort Worth Steel & Machinery Co., succeeding M. S. JACKSON, JR. Announcement is made by Company President J. I. JACKSON.**

Chosen by Civitans

Palmer Brown Is Top Citizen in Memphis

Palmer Brown, III, has been chosen as Civitans' Outstanding Citizen in Memphis.

The civic leader and widely-known supplier to the cotton industry was the surprised recipient of the Memphis club's eighth annual award on Jan. 10 at a luncheon.

L. PALMER BROWN, III

Honored as "an unselfish servant of his community," Brown was praised by nine speakers.

Among other activities, he has been president of the Memphis Cotton Carnival and his wife was the 1934 Carnival Queen, as Octavia Evans; while their daughter, now doing graduate work at Vanderbilt, was Queen in 1959.

Born in Meridian, Miss., 50 years ago, Brown has lived in Memphis most of his life and is head of the L. P. Brown Co., Exchange Building. He is a 1930 graduate of Washington & Lee.

He is president of the Downtown Association, a director of the Memphis Chamber of Commerce, chairman of the board of managers of Methodist Hospital, vice-president of Shelby United Neighbors, a director of the American Cancer Society and a member of the executive committee of Southwestern College.

In the past he has served as chairman of the Red Cross national convention, director of the Memphis Country Club, vice-president of the Tennessee Club and director of Le Bonheur Children's Hospital.

At Vicksburg Cargill Plans Elevator

Cargill, Inc., has taken an option to buy 29 acres south of Vicksburg, Miss., for a grain elevator and barge loading facilities.

Addison H. Douglass, Southern regional manager, said the construction will aid transportation from Cargill's plants throughout the Midwest.

New Plant for General Mills

General Mills has completed a new feed mill at Mendenhall, Miss.

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RETIRING SECRETARY of the Gin Machinery and Supply Association, A. G. Falk (shown on the left in right photograph), honored recently by the Association and Texas Ginners Association, receives a travelling bag from Ed Bush, who was re-elected president of the gin machinery group. Gin machinery officers, shown on the left, include, left to right, Bush; Vice-President Glen McCarty, Sherman, and Director Bill Woerner, Dallas.

At Exhibit Drawing

Machinery Group, Texas Ginners Honor Falk on Retirement

A. G. "ART" Falk, who has helped Texas ginners and exhibitors register at annual conventions for 28 years, has retired. In appreciation, members of the Gin Machinery and Supply Association, Inc., and Texas Ginners Association presented the Mobil Oil Co. representative with a travelling bag on Jan. 7.

Exhibit spaces were assigned for the 1961 Texas Ginners Association convention, and officers and members of the executive committee of the Gin Machinery Association were elected on Jan. 7 at a meeting in the ginners' headquarters in Dallas.

Edward H. Bush, vice-president of Texas Ginners, was re-elected president of the machinery group, the non-profit organization which handles exhibits and provides free entertainment at the Texas convention.

Glenn McCarty, Sherman, was named vice-president, succeeding Donald F. Mitchell, Dallas.

Ray Senter, Dallas, was re-elected treasurer.

Bill Woerner, Dallas, succeeded Falk as secretary.

Members of the executive committee for 1961 are the officers and Carsey Manning, Walter B. Moore, and U. H. Orhman, all of Dallas.

Plans for outstanding entertainment features at the convention, which will be held at the State Fair grounds in Dallas on April 9-11, have been developed by exhibitors and officials of the Ginners and Gin Machinery Associations. A variety show is scheduled for Monday night, April 10, and the annual dance will be held the following night. Both events will be held in the ballroom of the Statler Hilton Hotel.

Treat Cottonseed With Enough Fungicide

The importance of treating cottonseed for planting in 1961 with enough fungicide to assure proper disease control is being stressed by industry leaders who attended the Beltwide Cotton Production-Mechanization Conference.

With germination low in many states this season, it is essential that seed used for planting be treated to assure control of diseases. The cost of seed treatment is a very minor part of planting expenses (amounting to less than 10 cents per acre for material sufficient to make disease control certain). Thus, it is only good business to follow carefully the recommendations of each state's Experiment Station and Extension pathologist, or other informed sources, and use the full amount of material required for proper control of seed diseases.

Committee Hears Montgomery

R. A. Montgomery, Staple Cotton Cooperative Association, Greenwood, Miss., spoke at a Jan. 18 meeting of the Quality Committee of Tennessee Agricultural Council at Jackson. L. P. Fuqua of Milan is chairman.

Tennessee Ginners Meet

Directors of Tennessee Cotton Ginners Association met in Jackson on Jan. 11 to discuss future activities.

■ **JAMES A. LUSCOMBE, in charge, USDA Ginning Laboratory, Clemson, S.C., is pictured with the electronic instrument for measuring cotton moisture in an article on cotton research in Clemson's publication, Agricultural Research.**

• Soil Bank Kills Magnolia Mill

CLOSING of their cottonseed oil mill at Magnolia, Miss., has been announced by Mississippi Oil Mills.

The Soil Bank and failure of farmers to use available acreage after the Soil Bank was discontinued are listed as causes of the closing of the mill.

Machinery is being offered for sale through the office of J. B. Perry, Jr., general manager, at Grenada. The building and real estate will be sold.

G. E. Covington, who lives at Magnolia and is president of the Bank of Hazelhurst, was manager of the mill. T. L. Bond, cashier, has been transferred to the Jackson mill of Mississippi Oil Mills. J. B. Graham, superintendent, is at Magnolia at present.

Local interests established the mill in 1901, but discontinued operations when the boll weevil entered Mississippi. From 1908 to 1914, W. C. Carloss and others operated it intermittently. After remaining dormant from 1915 to 1919, the plant was bought by Covington-Perry interests. They renovated it and operated it independently until 1927, when the plant was merged into Mississippi Cottonseed Products Co.

After a fire in 1943, the Magnolia plant was rebuilt as a hydraulic mill and in 1954 screw presses were installed.

Sevin Now Is Flowable

Stauffer Chemical Co. has developed a flowable formulation of the new insecticide, Sevin. It is instantly dispersible in spray machinery—even in the low-agitation type units which are often used in airplanes.

Sevin formerly was available only as a wettable powder. The new Stauffer flowable formulation contains four pounds of Sevin per gallon. Stauffer is now marketing flowable Sevin nationally.

Edward Wendell Dies

Services were held in Dallas Jan. 13 for Edward G. Wendell. The retired general manager of the Southwestern division of the Link Belt Co. died suddenly Jan. 10 at his home. He was 68.

In Galveston

Cooperatives Plan Joint Meeting

■ **TEXAS Cooperative Ginners Association, Houston Bank for Cooperatives and Texas Federation of Cooperatives to meet.**

Over 1,000 members and stockholders of Texas Cooperative Ginners Association, Houston Bank for Cooperatives and Texas Federation of Cooperatives are expected to attend the joint annual cooperative meeting in Galveston Feb. 6-7. The Galvez Hotel will be convention headquarters, according to Bruno E. Schroeder, executive vice-president for the Ginners Association and the Federation.

Included on the two-day agenda will be the selection of Cooperative Ginner of the Year, Cooperator of the Year, and, for the first time, the presentation of Distinguished Service Awards.

Federation President Troy Kern of Cooper, Texas, will preside over the opening general session, Feb. 6, handing the gavel to Ginners Association President V. C. Johnson of Hutto, Texas, for the opening general session the following day. C. C. Thompson, Colorado City, Texas, chairman of the board of directors for the Houston bank, will emcee the final convention banquet.

Guest speakers for the general sessions include: F. L. Parnell, deputy assistant director of food and water, resources and production, Civil and Defense Mobilization, Washington; and Dr. Arthur A. Smith, economist and vice-president, First National Bank, Dallas.

V. C. JOHNSON

The cotton commodity group meeting and other special meetings are scheduled from 10:30 through 3:30, Feb. 7. Planned by chairmen Murrell Rogers, manager, Cen-Tex Cotton Oil Mill, Thorndale, Texas; David McElwrath, president, Producers Gin Association, Harlingen, Texas, and Dan Davis, general manager, Plains Cotton Cooperative Association, Lubbock, the cotton commodity meeting will cover the following topics:

"Current Trends in Marketing Cotton," Dan Davis, general manager, and C. E. Bowles, secretary, Plains Cotton Cooperative Association, Lubbock.

"Current Developments and Trends in Cottonseed Breeding." L. E. Ellwood, manager, Texas Planting Seed Association, Bryan.

"Cotton Research and Promotion," Earl Sears, National Cotton Council.

"A Recommended Farm Program for Cotton", Weber W. Pool, Sinton, Texas, vice-president, Texas Federation of Cooperatives.

Memphis Cotton Leader
W. B. Dunavant Dies

William B. "Buck" Dunavant, former president of the Memphis Cotton Exchange, and founder of W. B. Dunavant & Co., cotton merchants, died Jan. 5 after a brief illness. A member of the University Club and the Memphis Cotton Carnival secret society, Dunavant was 52.

Watershed Congress To Meet

"Count Down on Water", is the theme of the National Watershed Congress, meeting in Tucson, April 17-19, with headquarters in the Ramada Inn.

Topics will include water-use planning, multiple use of watersheds and water for thirsty lands.

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Ludlow Promotes Travis

HAROLD G. TRAVIS, vice-president of Ludlow Textile Products, has in addition been named assistant to Austin B. Mason, president, Ludlow Corp. Mason stated that Travis would have broader responsibilities and that his knowledge, based on 10 years experience with Ludlow and its customers, will greatly benefit the company. Travis will concentrate on development of new markets for Ludlow products.

John E. Williams, vice-president, Ludlow Corp., will assume complete responsibility for the coordination, direction and administration of all sales and marketing activities of the textile products division.

CALENDAR

CONVENTIONS MEETINGS.. EVENTS...

• Jan. 22-24 — Texas Cotton Ginners' Association Directors and Allied Industry Meeting. Echo Hotel, Edinburg. Edward H. Bush, P. O. Box 7665, Dallas, executive vice-president.

• Jan 30-31 — National Cotton Council annual meeting. Peabody Hotel, Memphis. Wm. Rhea Blake, executive vice-president, P. O. Box 9905, Memphis.

• Feb. 4-7—Southeastern Gin Suppliers' Exhibit. Biltmore Hotel, Atlanta. Concurrent with convention of Alabama-Florida, Georgia and Carolinas Cotton Ginners' Association. For exhibit information, write Tom Murray, P. O. Box 1098, Decatur, Ga.

• Feb. 4-7—Georgia Cotton Ginners' Association annual meeting. Biltmore Hotel, Atlanta. Tom Murray, P. O. Box 1098, Decatur, Ga., executive vice-president.

• Feb. 4-7 — Alabama-Florida Cotton Ginners' Association annual meeting. Biltmore Hotel, Atlanta. Tom Murray, P. O. Box 1098, Decatur, Ga., executive vice-president.

• Feb. 4-7 — Carolinas Ginners' Association annual meeting. Biltmore Hotel, Atlanta. Maxie Helms, P. O. 512, Bennettsville, S.C., office secretary.

• Feb. 6-7—Texas Cooperative Ginners' Association, Texas Federation Of Cooperatives and Houston Bank For Cooperatives joint annual meeting. Galvez Hotel, Galveston, Texas. For information write Bruno E. Schroeder, 307 Nash Building, Austin.

• Feb. 17 — Oklahoma Cotton Ginners' Association annual meeting. Biltmore Hotel, Oklahoma City. Mrs. Roberta Ruebell, 307 Bettes Bldg., 1501 Classen Blvd., Oklahoma City 6, secretary.

• Feb. 20-21 — Cottonseed Processing Clinic. Southern Regional Laboratory, New Orleans. Sponsored by USDA and Mississippi Valley Oilseed Processors' Association. C. E. Garner, 401 Exchange Building, Memphis 3, Association secretary.

• March 7-8—Western Cotton Production Conference, Ramada Inn, Phoenix, Ariz. Sponsors, Southwest Five-State Cotton Growers Association and National Cotton Council, P. O. Box 9905, Memphis.

• March 12-14—Arkansas-Missouri Cotton Ginners' Association annual meeting. Memphis, Tenn. (In conjunction with Midsouth Gin Supply Exhibit.) W. Kemper Bruton, Blytheville, Ark., executive vice-president.

• March 12-14—Tennessee Ginners' Association annual meeting. Memphis, Tenn. Harold (Pete) Williams, Jackson, Tenn., secretary. (In conjunction with Midsouth Gin Supply Exhibit.)

• March 23-25—American Cotton Manufacturers Institute annual meeting. Fontainebleau, Miami, Fla. For information write ACMI headquarters, Charlotte, N.C.

• April 9-11—Texas Cotton Ginners' Association annual convention. State Fairgrounds, Dallas. For information, write Edward H. Bush, executive vice-president, P. O. Box 7665, Dallas 26.

• April 9-12—National Peanut Council annual convention. Mayflower Hotel, Washington. Maureen Devery, Council office, Dupont Circle Building, Washington 6, secretary.

• April 12-15—Alabama Textile Manufacturers' Association annual meeting. Buena Vista Hotel, Biloxi, Miss.

• April 17-18—Mississippi Valley Oilseed Processors' Association annual meeting. Buena Vista Hotel, Biloxi, Miss. C. E. Garner, 401 Exchange Building, Memphis 3, secretary.

• April 19-20 — National Cotton Compress & Warehouse Association annual meeting. Westward Ho Hotel, Phoenix. John H. Todd, 1085 Shrine Building, P. O. Box 23, Memphis 1, executive vice-president.

• April 26-29 — Georgia Textile Manufacturers' Association annual meeting. Hollywood (Fla.) Beach Hotel. T. M. Forbes, 740 C&S National Bank Building, Atlanta 3, executive vice-president.

• May 1-2 — Short Course for Oil Mill Operators. Memorial Student Center, Texas A&M College. Sponsored by College, Texas Cottonseed Crushers' Association and International Oil Mill Superintendents' Association. For information, write Dr. J. D. Lindsay, Texas A&M College.

• May 1-3—American Oil Chemists' Society spring meeting. Sheraton-Jefferson Hotel, St. Louis. Society headquarters, 35 East Wacker Drive, Chicago 1.

• May 8-9—American Cotton Congress. Pioneer Hotel (formerly Lubbock Hotel), Lubbock, Texas. Burris C. Jackson, Hillsboro, Texas, chairman.

• May 14-16—National Cottonseed Products Association annual convention. Eden Roc Hotel, Miami Beach, Fla. John F. Moloney, P. O. Box 5736, Memphis, secretary-treasurer.

• May 15-20 — National Cotton Week. Sponsored by National Cotton Council, P. O. Box 9905, Memphis.

• May 16-17—Cotton Marketing Conference and Research Clinic. Peabody Hotel, Memphis. Sponsor, National Cotton Council, P.O. Box 9905, Memphis 12.

• June 6-9—International Association of Seed Crushers' annual meeting. Stockholm, Sweden. A. E. Peel, London, secretary.

• June 11-13—Tri-States Oil Mill Superintendents' Association annual meeting. Edgewater Gulf Hotel, Edgewater Park, Miss. O. D. Easley, Southern Cotton Oil Div., Wesson Oil & Snowdrift, 1351 Williams St., Memphis 1, secretary-treasurer.

• June 18-20 — Texas Cottonseed Crushers' Association annual convention. Galvez Hotel, Galveston. Jack Whetstone, 629 Wilson Building, Dallas, secretary-treasurer.

• June 18-21 — North Carolina-South Carolina Cottonseed Crushers' Associations' annual meeting. Myrtle Beach, S.C., Ocean Forest Hotel. Mrs. Durrett L. Williams, P. O. Box 514, Columbia, S.C.; and Mrs. M. U. Hogue, P. O. Box 6415, Raleigh, N.C., secretary-treasurers.

• June 21-23 — Southwestern Peanut Shellers' Association annual meeting. Hilton Hotel, San Antonio, Texas. John Haskins, Durant, Okla., secretary-treasurer.

• June 25-27 — Southeastern Cottonseed Crushers' Association annual convention. Grand Hotel, Point Clear, Ala. C. M. Scales, P. O. Box 1145, Decatur, Ga., secretary-treasurer.

• June 25-27 — International Oil Mill Superintendents' Association annual convention. The Granada Hotel (formerly the Hilton Hotel), San Antonio. H. E. Wilson, Wharton, Texas, secretary.

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Beltwide Conference

(Continued from Page 47)

been treated with pre-emergence herbicides has caused some concern over possible damage from herbicidal residues in the soil. Recent studies and grower experience indicates that repreparation of the seed bed by cultivation or disking greatly reduces this hazard. There also appears to be little hazard involved in planting through the old treated band into the untreated soil beneath it. Retreatment with a pre-emergence herbicide is not recommended.

• **Post-emergence Herbicidal Oil** — Post emergence herbicidal oil remains the only chemical recommended for early-season post-emergence control. It is recommended in all cotton producing states except the Carolinas, New Mexico, Oklahoma, and Arizona. Recommendations for its use are the same as in 1960.

Perhaps the biggest error in use of herbicidal oil has been delay in application. This is particularly true where a pre-emergence herbicide has controlled many, but not all, of the weeds. In such cases the grower tends to wait on the emergence of new weeds before making the first application. Old weeds frequently grow beyond a susceptible size during this waiting period and produce a weed problem sovlable only by hand hoeing. Regardless of whether a pre-emergence herbicide has been used, the oil should be used to establish essentially 100 percent control as soon as age and condition of cotton permits.

Efficiency of the first application is usually increased if made before any cultivation is done. Only shielded cultivation should be used so long as further oil application is intended. As with pre-emergence herbicide, judicious use of dirting cultivation after the last oil application may be beneficial.

• **Flame** — Flame cultivation for mid-season, and to some extent, late-season control of weeds is currently recommended in Arizona, Arkansas, California, Louisiana, Mississippi, and Missouri. No changes have been made in the recommendations since 1960.

As with herbicidal oil, best results with flame are obtained if application is made when weeds are less than one inch high. Research data on influence of dirting cultivation are incomplete with respect to flame. Results to date, however, indicate that judicious dirting in early season does not significantly affect flaming results if rainfall is adequate to re-smooth the row. Dirting cultivation just in advance of flaming can, however, produce a row profile conductive to poor control of weeds and excessive injury to the cotton.

• **Chemical Lay-by**—At least trial scale or qualified recommendations for use of chemical lay-by are now made in Alabama, Arizona, California, Georgia, Mississippi, Missouri, New Mexico, South Carolina, and Tennessee. Diuron is the most widely recommended material, while 3-(p-chlorophenyl)-1, 1-dimethylurea (monuron) and N-1-naphthylphthalamic acid (NPA) are also recommended in one or two states. Rates of application for diuron and monuron range one to two pounds per acre, and for NPA from six to eight pounds per acre.

Lay-by herbicide is applied to the soil surface underneath the cotton as a broadcast treatment. High soil moisture from rainfall or irrigation soon after application (5 to 10 days) appears essential for best results. Although inclusion of a surfactant with the herbicide has increased the effect on emerged weeds in limited experimentation, it is currently recommended that treatment be made without added surfactant and that fields be free of emerged weeds at time of treatment. Cultivation after application is not recommended.

There is still considerable doubt as to the best time to apply a chemical lay-by. Until additional research is completed it is anticipated that current suggestions for application one to two weeks earlier than normal lay-by will remain in effect. In humid areas, if application is made early, chances of chemical-activating rainfall are perhaps better. Early application could eliminate one or more cultivations, but a longer period of control by the chemical would be needed. If application is delayed too long, cotton may grow so large as to interfere with herbicide placement. Age of cotton influences its tolerance to the chemical, but the critical stage of growth has not been established.

The most controversial point is undoubtedly whether or not a chemical lay-by is economically justifiable. In irrigated areas of the Far West, use of chemical lay-by is recommended only where a severe late-season problem is known to exist. In Mississippi and South Carolina only a qualified recommendation has been made pending additional research. Ample data are available to show that good control of weeds is obtainable under several conditions, and hazard of crop damage from proper application is slight. No data, however, have been published to show that chemical lay-by increases the grade of cotton, or that weed populations are reduced the year following use of a chemical lay-by. Chances of such benefits are thought by some investigators to be greatest in fields having broken stands, in small cotton which fails to lap in middles, and on row ends.

Lay-by herbicides are subject to the same restrictions as pre-emergence herbicides with respect to species of weeds controlled, soil type, and activating soil moisture. Soil moisture limitations can be controlled, however, to some extent by currently used methods of irrigation.

• **Spot Treatment**—Spot treatment with the sodium salt of 2.2-dichloropropionic acid (dalapon) for control of Johnsongrass is recommended in all cotton-producing states. It should be applied at rates of 0.10 to 0.20 pounds per gallon of water as a wetting spray to Johnsongrass 8 to 12 inches tall. Various herbicidal oils also are recommended by several states and the sodium salt of trichloroacetic acid (TCA) is recommended in Alabama.

Most success with spot-treatments has been obtained where infestations covered less than five percent of the drill-row area. Labor and material requirements become excessive in heavy infestations.

Dalapon is a translocatable herbicide which is somewhat slower acting than the herbicidal oils which act primarily by contact effects, and results with dalapon are somewhat more dependent on environmental conditions. On the other hand a successful application more nearly achieves complete kill of the treated plant than does a successful application of a contact herbicidal oil. Fewer applications per year are required for control with dalapon than with herbicidal oil because of this difference in mode of action.

Insects:

■ **Dr. W. C. Nettles, Entomologist, South Carolina Experiment Station, Clemson.**

For 1961 Cotton Insect Control programs, let me emphasize the importance of translating scientific information into action.

• **Important Factors**—Stress should be given some important factors which now

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begin to loom large on the horizon. Some of these are:

■ RESISTANCE of certain insects to insecticides

■ PRECAUTIONS for using and handling insecticides

■ INSECTICIDES and miticides for general use

■ GUIDES for using insecticides

■ SURVEYS

■ INTEGRATION of insect control with production practices

■ COST CUTTING and insect control

I should like to attempt to highlight these points in the few minutes left to me.

• **Resistance to Insecticides** — Of more concern is boll weevil resistance. Texas reports four areas; Georgia reports areas where 500-700 times as much insecticide was needed for control; and South Carolina reports areas with a low level of resistance.

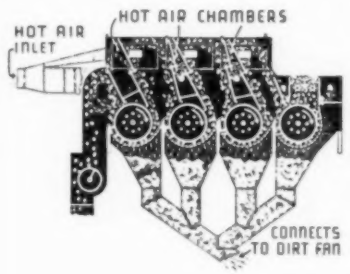
Two new words may be important: (1) reversion, found in areas where resistant insects appeared to become more susceptible; (2) dilution, may offer the genetic explanation of how and why reversion took place.

This places added responsibility on educational and research forces in the respective states. Let me emphasize keeping in touch with local authorities on which insects are resistant in their areas.

• **Precautions**—Billions of pounds of insecticides have been used in cotton insect control without the dire consequence which some envisioned. This has been the result of pointing out the hazards and precautions and effective education down to the individual owner and operator. This must continue.

Areas which need stress are:

■ PREVENTION OF RESIDUES on food, forage, and pasture.



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■ PREVENTING CONTAMINATION of water where vast areas of cotton are grown in a water shed.

■ CAUTION IN APPLICATION after bolls open.

■ PREVENTION OF DRIFT to fruit or vegetable crops, or to forage used for dairy cattle or beef cattle for slaughter.

■ PREVENTION OF HAZARDS to checkers.

Cottonseed is considered a raw agricultural product under the Miller Pesticide Residue Ammendment. By-products are used as feed for beef and dairy animals; and tolerance for pesticides in milk is zero.

It is important to follow state recommendations and observe carefully label registration to avoid residue hazards. Use pesticides on crop specified, at time specified, and at rate specified.

• **General Use** — Insecticides and miticides for general use are covered in "Preliminary and Unedited Excerpts taken from the Conference Report on Cotton Insect Research and Control, Greenville, S. C., January 9-10, 1961." They are mimeographed and distributed by the National Cotton Council, and through the courtesy of Clemson Agricultural College.

• **Guides**—Never has there been greater need for concise recommendations for each state. We consider it very important that you obtain a copy of your state's cotton insect control recommendations or guides.

We also urge that you follow your state's recommendations and not those of some other state. This is especially true of choice of chemicals, timing applications, equipment to use, and other factors.

Your encouragement and cooperation may result in meetings or in use of other educational media which are important to guide insect control programs.

• **Surveys** — Progress is being made in increasing survey activities in most states. Surveys are valuable and essential. Other names given surveys are use of scouts and use of cotton checkers.

Weevil resistance and unusual bollworm infestations in recent years place added need for knowing insect conditions. The subtle nature of insect damage leaves many a grower bankrupt. Properity checking helps overcome this pitfall.

• **Integration with Production Practices** —Insect control is only one essential operation in efficient cotton production. Chemical and cultural control practices should complement each other. An integrated cotton production program should include:

■ PROPER LAND selection.

■ THOROUGH SOIL preparation.

■ SELECTION of best adapted variety of cotton, plus treatment of planting seed and planting for a uniform stand.

■ ADEQUATE FERTILIZATION and weed control.

■ HARVESTING early.

■ EARLY STALK destruction and field clean-up.

• **Cost Cutting** — The nation's cotton crop has a value of $2,500,000,000. Insects cost farmers $350 million a year. Insecticides and their application result in an additional cost in producing the crop of $75 million.

Cost cutting may be the same as uneconomical expenditure. When one considers the above statistics can the conclusion be other than that the best way to cut costs is to spend more money on judicious application of insecticides.

Defoliation:

■ **Dr. W. H. Tharp, Plant Physiologist, Production and Marketing Division, National Cotton Council, Memphis.**

I would first like to present a realistic Beltwide picture of the more critical problems faced in using chemicals as an aid in the efficient harvesting of high quality cotton. Secondly, I would like to explain what chemicals and "know-how" are available to solve existing difficulties.

Within the past 10 years there has been at least a threefold increase in the use of harvest-aid chemicals on cotton. There also has been a steady, though not glaring, improvement in efficiency of the chemicals.

This amazing increase in use should indicate that most application problems have been solved and that materials and know-how are at hand to meet any specific need. This could not be farther from the truth. But neither chemicals nor application knowledge should be blamed

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for all current dissatisfaction and problems.

• **Problems Not Chemical** — From the outset, well before 1952, efficient chemicals were available and a lot of sound research had provided accurate guides for their use. But in 1952, and again as we look forward to 1961, many problems existed, and they will again arise year after year, because of things other than the chemicals—because of plant condition at treatment time, the weather, and the double need placed on use of desiccants and defoliants. That is, thoroughly successful harvest-aid chemical application is considered one which not only removes or dries up leaves so as to enhance harvest efficiency and quality, but it must do so without reducing yield or quality.

Currently available chemicals are designed to do these things, success isn't always obtained. Reduction from full efficiency is now known to result from a number of factors. The most serious of these are lack of leaf moisture, low temperature, immature foliage and, perhaps most important, excessive growth that accompanies high yields and problems that are often inescapable with such yields.

High yields are too often associated with a larger, leafier and later plant which is hard to defoliate. Such dense foliage can seldom be covered with one application, nor will any one rate give adequate drop of both mature and immature leaves. In addition, lateness may force application into cool weather or contribute to dry plant conditions, both of which reduce abscission efficiency. Worst of all, these plants may lodge, or the bottom crop may be deteriorating faster than the top crop is maturing.

• **Problem Acres**—An informal inquiry made last fall among workers throughout the Belt who are best able to evaluate "problem acres" revealed the following trends: In the Southeast only about 10 percent of the total acres were estimated to be in this "problem" condition. This increased to 15 percent in the Southwest, 25 percent in the Far West and about 35 percent in the Midsouth where unpredictable rains and lush cultural conditions often produce high yields on very unmanageable plants.

The inquiry revealed the manner in which researchers, educators and growers are currently attempting to cope with these harvest-aid problems. Except in the Southeast, the predominate cure is multiple application. Use of bottom defoliation with later complete defoliation is gaining favor in the Far West and, to some extent, in the Rain Belt. In the Southwest there has been a decided shift to desiccation. But most interesting, and of more far reaching impact, is the trend among both investigators and growers to practice preventative measures. These include better control of water and fertilizer, more attention to variety and to a specific type of culture suited to that variety. In many cases, topping, which has been used irregularly in the West, is being adopted in other sections.

• **What About 1961 Guides?**—With full realization that many problems are outside the scope of the efficiency-range of current defoliants, let's look at chemicals which have become available in 1960 and project, as best possible, what will be listed in the "Guides" for 1961 use.

Until 1949 only one efficient chemical was available for either defoliation or desiccation. That single chemical is still highly efficient if all conditions for its use as a defoliant are optimum. By 1952, however, a wide range of chemicals had been introduced for both defoliation and desiccation. That year, nine distinctly different chemicals were listed in the Beltwide Guides.

Of the 16 different harvest-aid chemicals listed at some time during the last 10 years, six are now available. This excludes hundreds that have been tested and dropped for either efficiency or price reasons. This nearly 15 years of screening has assured the grower that harvest-aid chemicals today are the best research and industry could provide.

Let's look at what may be in store for 1961.

All chemicals offered commercially in 1960 and listed in the Beltwide "Guides" will be available until March 6, 1961. Arsenic acid also is available for use as a desiccant. So far as I have been able to determine, none of these chemicals has received either a tolerance or has been declared non-residual. We hope, however, that all of these chemicals will be approved for use by the time they are needed in 1961.

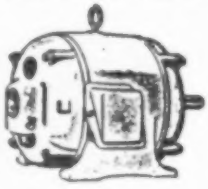
I am sure you will be interested in what is available to aid the grower and those who advise him to make wise use of these chemicals.

First, "Cotton Pest Control Guides" will continue to list currently available chemicals, preferred rates, and necessary dilution information, along with a brief explanation of how to cope with specific problems. These guides are available from the National Cotton Council upon request.

For a more complete explanation of problems and a better understanding of basic factors involved, ARS Special Report No. 22-58 entitled "Harvest-Aid Chemicals for Cotton" is now available. Written in layman's language, it is available upon request from the ARS Information Service in Washington.

To best cope with local problems, obtain counsel from local authorities.

SPARE MOTORS



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Application Equipment:

■ **H. B. Goolsby,** Agricultural Engineer, Georgia Extension Service, Athens.

For years farmers over the entire Cotton Belt have been spraying for insect control. Only the last four or five years could we say spraying is doing the job and taking over in insecticide application.

• **Threefold Reasons**—Reasons are threefold:

1. We know more about spray pattern

nozzle size and pressures for cotton insect control.

2. Insecticides have become more applicable to spraying.

3. Spraying is doing a better job.

• **Spraying**—There are four main advantages to spraying:

1. Can be done in winds up to 15 m.p.h.

2. Less expensive.

3. Sticks better to leaves and buds. Has better penetrating effect.

4. More versatile (several insecticides can be mixed more readily than with dust).

Main disadvantage of spraying is that it requires more supervision and know-how.

Entomologists say the best way to control insects is to place the insecticide where it will do the most good. Boll weevils can best be controlled if timing of application is coordinated with the life cycle. In Georgia, timing is on a five-day interval basis.

One of the main things to remember when setting up cotton sprayers is to obtain the correct spray pattern with necessary pressure to have the penetrating effect. Droplet size is also very important.

If too small, they tend to fog and drift. If too large, they strike leaves and run off like rain.

Below are recommendations from most states in the Cotton Belt on how to secure the above mentioned spray pattern.

State	Nozzle Size	Pressure (p.s.i.)
Oklahoma	Hollow Cone No. X3	40-60
California	No definite printed recommendations (common use flat)	40-60
Texas	Hollow Cone X3 to X6	60
Arizona	Use mostly airplane No. X3	60
Mississippi	X3 Hollow Cone	60
New Mexico	X3 Hollow Cone	60
Arkansas	Hollow Cone X3, X6, G3, or G6	60-90
North Carolina	No definite recommendation. Both flat and Hollow Cone	40-90
Georgia	X3 Hollow Cone	60

The majority of states in the Belt recommend one nozzle directly over the row for early season control (before plants are squaring freely) and three nozzles per row for remaining applications. The top third of the plant is the critical area. Some states recommend two or more nozzles on each side of the plant for tall cotton. Most states also recommend low gallonage spraying, from 2 to 10 gallons per acre.

Recommendation for Georgia is as follows:

Nozzle type—Hollow cone
Nozzle size—No. 3
Pressure—60 p.s.i.
Number of nozzles—Three per row after plants are squaring freely.

Sprayers equipped and adjusted in this manner are giving excellent results when recommended insecticides are used at correct dosages. It is possible that other sizes of spray nozzles will give good coverage if adequate pressures are used. It is suggested that pressure be increased about 10 pounds for each nozzle size increase (example: 70 pounds pressure with a No. 4 nozzle).

Use of nozzle sizes larger than number three will require the use of more water per acre and will not improve control. With the suggested sprayer "set-up," there is no advantage in using more than seven and one-half gallons total volume per acre regardless of the size of cotton.

Spray patterns of tiny droplets with enough force to reach buds and squares are necessary for effective cotton insect control. If nozzles are set too close to plants, the spray cone is broken before the spray pattern has a chance to develop. Nozzles should never be allowed to drag through plants.

Awards To Be Given At Short Course

Representatives of sponsoring organizations, meeting in San Antonio to plan the annual Short Course for Oil Mill Operators, have voted to present three awards at this year's course.

The course, which will be held May 1-2 at Texas A&M, is sponsored by the College, Texas Cottonseed Crushers Association and International Oil Mill Superintendents Association. The Crushers will present a $50 award to the superintendent whose mill has the best safety record, and the Superintendents Association will present a $35 and $15 award to the two superintendents with the best method of controlling protein.

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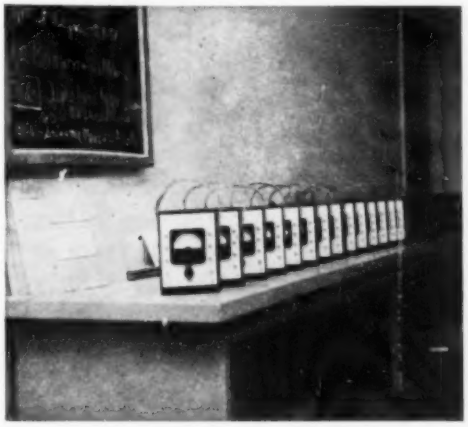

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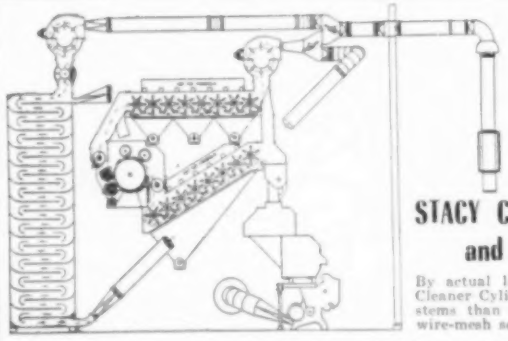

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During the past year many Stacy Cleaners have been equipped with Grid Bars instead of screens with amazing results. In examining the trash we found full cotton leaves, and practically all of the stems, sticks and trash were removed, most of which could not possibly have passed through a wire-mesh screen.

These Grid Bars are available for all Stacy Cleaners now in the field. The more leaf trash left in the cotton entering the gin stands, the greater the loss of lint at the lint cleaners, as the cotton fibres adhere to each particle of trash and are thrown off.

Closed view of our eight cylinder cleaner and drier.

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laugh it off

The first American astronaut to land on Mars cautiously emerged from his rocket ship. He looked around and saw coming towards him a beautiful babe. She was the most wonderful hunk of woman he'd ever seen. Only she was 11 feet tall. He waited until she came close. Then he said quickly: "Take me to your ladder. I'll see your leader later."

• • •

A happily married couple—a jealous wife and a husband who believed in reincarnation. Finally the husband died. Keeping a pact they had had for years, the wife communicated with him in the spirit world, twelve months after his untimely demise.

"Are you happy there?" she asked.

"Happier than I ever was before," he replied. "The pastures here are greener, and it's indeed beautiful. And the weaker sex are the most gorgeous creatures you ever saw. Wistful eyes that speak of love; sleek bodies and beautiful rounded forms."

"Oh, dear!" she expostulated. "With so much temptation about you, I'm afraid you'll do something you'll be ashamed of. I do hope I can soon join you in Heaven."

"Heaven?" boomed back the reply. "Who said I was in Heaven? I'm a bull in Montana."

• • •

Patient: "How's it come when I go down to the cellar I feel all right, but when I come back up the steps, I get dizzy?"

Doctor: "What do you keep in the cellar?"

• • •

Ad in newspaper: "Wanted: Husband for beautiful blond, age 18. Must have money to support her in absolute luxury. Taste runs to mink, caviar, diamonds, Applicant please write 'Desperate Father', Box 44."

• • •

How come you haven't ever married that girl you're so crazy about?

Well, I got to thinking. If I married her, then I wouldn't have any place to go nights.

• • •

The sneakiest door-to-door salesman we ever heard of is the one whose opening line to the housewife was: "I'd like to show you a little item your neighbors say you can't afford."

• • •

Mr. Green: "Do you mean to say they put him in jail for something he didn't do?"

Mr. Brown: "Yeah . . . he didn't pay his income tax."

• • •

"George," said the wife to her slightly tipsy husband as they left the cocktail gathering where he had been the life of the party. "Did anyone tell you how witty you are?"

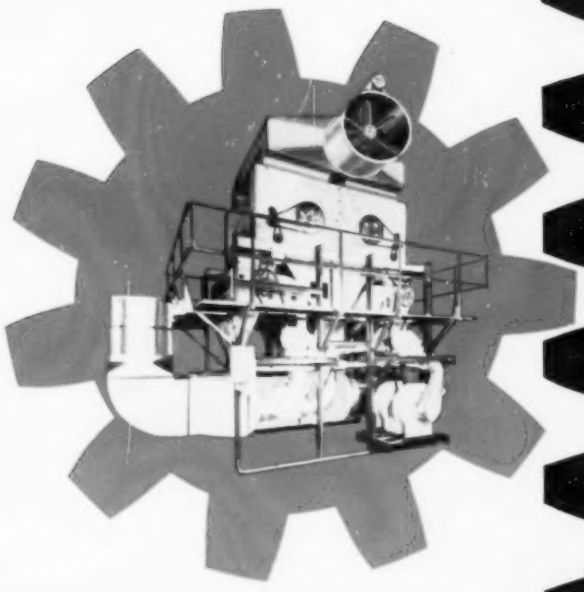
He looked at her, pleased. "Why no dear," he said, "I don't think anyone ever did."

"Well," she snapped, "then where did you ever get the idea?"

• • •

The big-time Charley said to the well-stacked Indian girl, "I've got two-bits that says I can take you out and show you the best time you ever had."

"I've got a buck that says you can't," retorted the girl.



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This saving in operation and maintenance cost is only a part of the profit picture for you. MOSS LINT CLEANERS have a proven history of raising all cotton a full grade or more, improving color and providing uniform staple length. This means added dollars on every bale for the grower . . . greater ginning volume for you. MOSS LINT CLEANERS are geared to give you the *most* for your investment. Call or write for details now!

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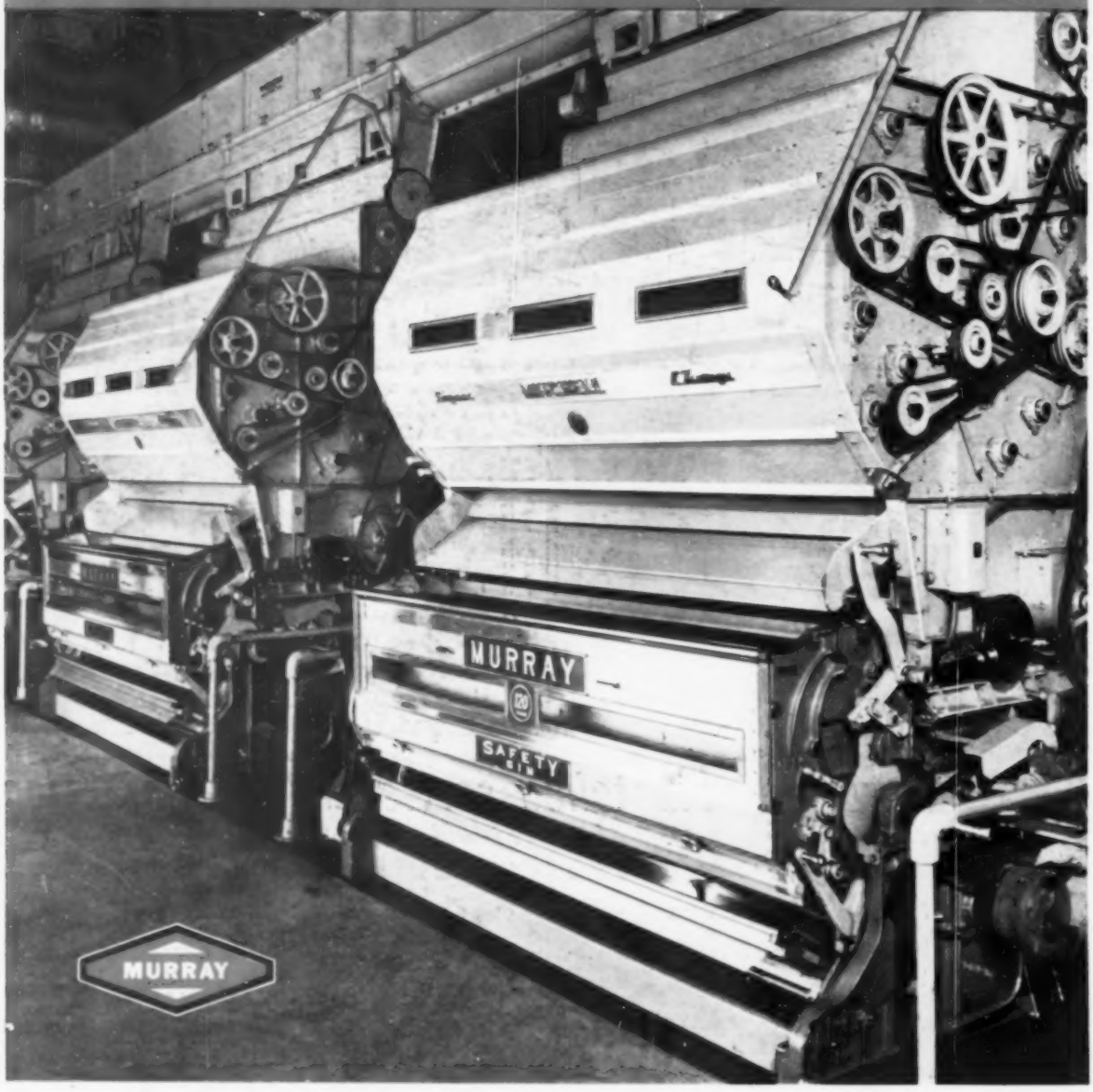

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